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MUSÉUM NATIONAL D'HISTOIRE NATURELLE

ORSTOM

MÉMOIRES DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE

TOME 174

ZOOLOGIE

1997

Résultats des Campagnes MUSORSTOM

Volume 17

Coordonné par

Bernard SÉRET

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Ce volume des Résultats des Campagnes MUSORSTOM *traitant des poissons de profondeur de Nouvelle-Calédonie est dédié à Pierre* FOURMANOIR, *océanographe biologiste de l'ORSTOM de 1950 à 1984. Il a effectué toute sa carrière dans la région indo-pacifique (Madagascar, Ile de la Réunion, Comores, Vietnam, Philippines, Nouvelle-Calédonie, Vanuatu).*

Durant son séjour malgache, Pierre FOURMANOIR *a étudié les poissons d'intérêt économique et dressé un inventaire ichtyologique des Comores. A cette époque, le premier coelacanthe venait d'être découvert. Il participa alors aux recherches du second spécimen et partagea la déception française... Mais le professeur J. L. B.* SMITH *(descripteur du premier coelacanthe) lui conserva toute son amitié puisqu'il le considérait comme son « fils ichtyologique » (dixit Margaret M.* SMITH*).*

En Nouvelle-Calédonie où il séjourna plus de 13 ans, Pierre FOURMANOIR *s'est intéressé naturellement aux poissons coralliens. L'ensemble de ses travaux sur l'ichtyofaune corallienne constitue un apport important à l'ichtyologie du Pacifique Sud. C'est à son initiative que des pêches expérimentales profondes ont été effectuées, notamment sur les pentes externes récifales de Nouvelle-Calédonie, des Iles Loyauté et du Vanuatu. En effet, il a toujours eu le souci, dans ses travaux de faunistique, de rechercher de nouvelles espèces économiques.*

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Volume 17 : *Mém. Mus. natn. Hist. nat.*, **174** : 1-215, 93 fig., (1997). ISBN : 2-85653-500-3.

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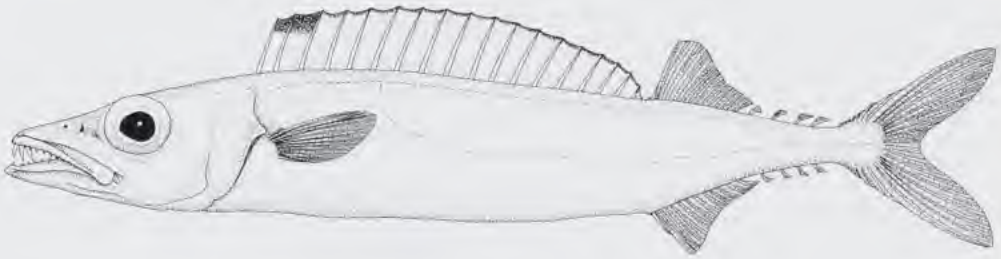
résultats des campagnes

MUSORSTOM

Volume 17



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ISBN : 2-85653-500-3
ISSN : 1243-4442
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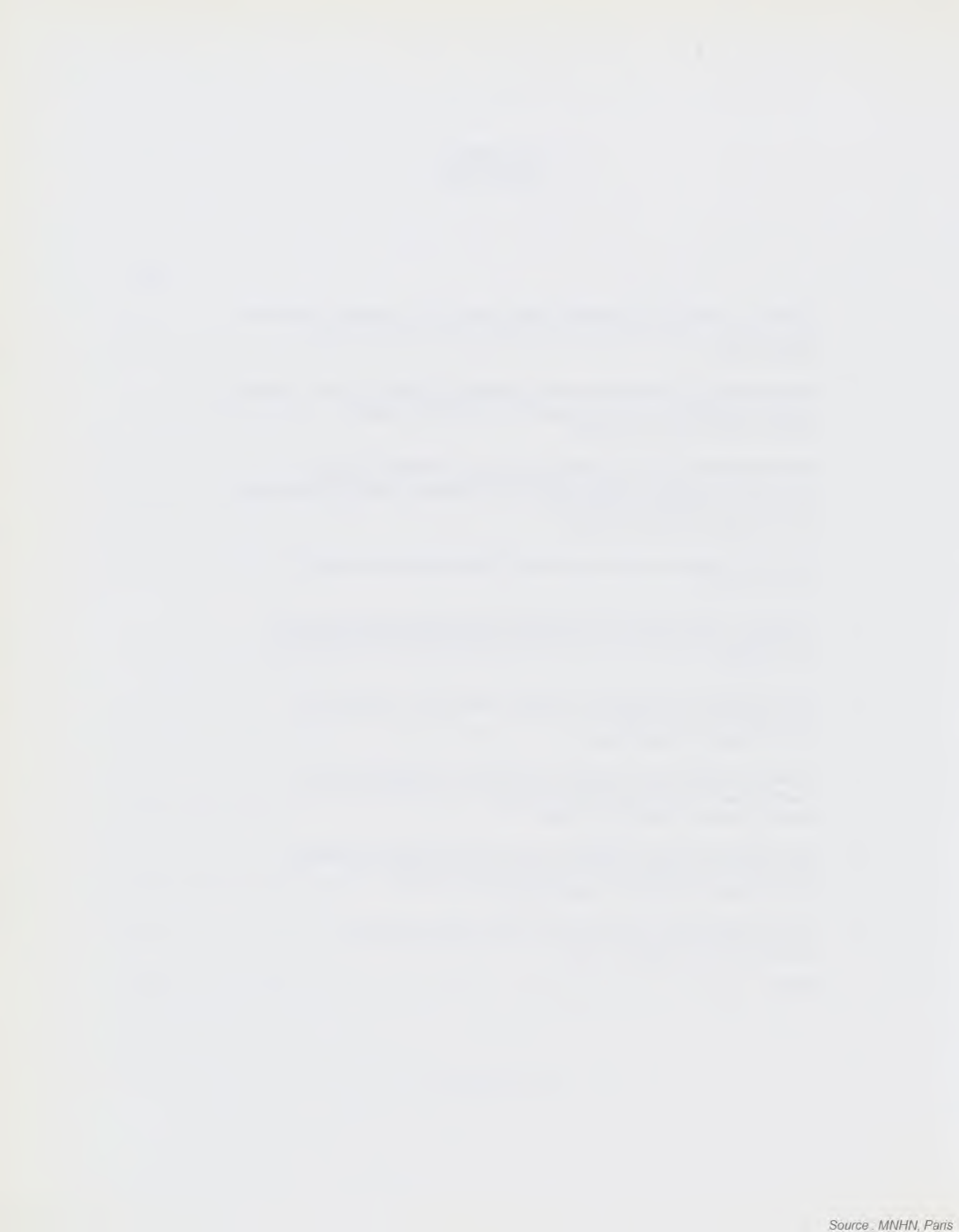

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Poissons de profondeur de Nouvelle-Calédonie : Apports des campagnes MUSORSTOM.

Deep water fishes of New Caledonia: Contributions of the MUSORSTOM cruises

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ABSTRACT

This volume of the MUSORSTOM series presents a part of the results of the studies on the deep water fishes collected during the exploration cruises performed in the economic zone of New Caledonia in the past decade. It includes 8 contributions describing 85 species, with 16 new, representing 49 genera and 15 families.

RÉSUMÉ

Ce volume de la série des campagnes MUSORSTOM présente une partie des résultats des études sur les poissons de profondeur récoltés dans la zone économique de Nouvelle-Calédonie au cours de la dernière décennie. Il comprend huit contributions décrivant 85 espèces dont 16 nouvelles, représentant 49 genres et 15 familles.

SÉRET, B. 1997. — Poissons de profondeur de Nouvelle-Calédonie : apports des campagnes MUSORSTOM. *Deep water fishes of New Caledonia: contributions of the MUSORSTOM cruises*. *In*: SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 9-16. Paris ISBN 2-85653-500-3.

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Depuis 1976, l'Institut français de Recherche Scientifique pour le Développement en Coopération (ORSTOM) et le Muséum national d'Histoire naturelle de Paris (MNHN) ont entrepris une série de campagnes d'exploration dans la zone indo-ouest-pacifique. Les trois premières campagnes (MUSORSTOM 1, 2 et 3) ont exploré les eaux profondes des Philippines. Les campagnes suivantes (MUSORSTOM 4, 5 et 6) ont eu pour but d'explorer la faune bathyale de Nouvelle-Calédonie, des Chesterfields et des Iles Loyauté. A ces campagnes de la série MUSORSTOM, il faut ajouter les campagnes CHALCAL 1 aux Chersterfields, CHALCAL 2 sur la Ride de Norfolk, BIOCAL, BIOGEOCAL et AZTEQUE au large des côtes méridionales de la Nouvelle-Calédonie. Des comptes rendus détaillés contenant les listes des stations de ces campagnes, ont été publiés par : COTILLON & MONNIOT (1987), FOREST (1981, 1986, 1989), GRANDPERRIN *et al.* (1990), LÉVI (1987), RICHER DE FORGES (1986, 1990, 1993), RICHER DE FORGES & LABOUTE (1989), RICHER DE FORGES *et al.* (1984, 1986, 1987, 1990).

Le programme des campagnes MUSORSTOM a été étendu aux régions voisines de la Nouvelle-Calédonie : MUSORSTOM 7 a eu lieu en 1992 aux îles Wallis et Futuna (RICHER DE FORGES & MENOU, 1993) et MUSORSTOM 8 au Vanuatu en 1994. D'autres sont prévues dans les années à venir en Polynésie Française et en Nouvelle-Guinée.

Parallèlement aux campagnes exploratoires de la série MUSORSTOM, un programme d'exploration des ressources des monts sous-marins situés dans la zone économique de Nouvelle Calédonie a été entrepris par le Centre ORSTOM de Nouméa en 1990-91. Dans le cadre de ce programme, 11 campagnes (BERYX 1 à 11) ont permis d'apporter un matériel biologique complémentaire car les engins de pêche utilisés (palangres de fond, chaluts à poissons, casiers) étaient différents de ceux utilisés habituellement lors des campagnes MUSORSTOM (chaluts à crevettes, chaluts à perche et dragues). Des comptes rendus de ces campagnes ont été publiés par: GRANDPERRIN *et al.* (1990, 1991, 1992), GRANDPERRIN & LEHODEY (1992), LEHODEY *et al.* (1992), LEHODEY (1994).

En complément de ces campagnes d'exploration, une mission (CALSUB) de la soucoupe plongeante « CYANA » a été effectuée en 1989 dans la fosse des

Since 1976, the "Institut français de Recherche Scientifique pour le Développement en Coopération" (ORSTOM) and the "Muséum national d'Histoire naturelle" (MNHN) have carried out a series of exploration cruises in the Indo-West-Pacific region. The first three cruises (MUSORSTOM 1, 2 and 3) explored the deep waters off the Philippines. The following cruises (MUSORSTOM 4, 5 and 6) aimed to explore the bathyal fauna off New Caledonia, the Chesterfields Islands and the Loyalty Islands. Besides this MUSORSTOM series, some others cruises took place in the New Caledonian area: CHALCAL 1 off the Chesterfields, CHALCAL 2 on the Norfolk Ridge, BIOCAL, BIOGEOCAL and AZTEQUE off southern New Caledonia. Detailed reports including the lists of the stations were published by: COTILLON & MONNIOT (1987), FOREST (1981, 1986, 1989), GRANDPERRIN et al. (1990), LÉVI (1987), RICHER DE FORGES (1986, 1990, 1993), RICHER DE FORGES & LABOUTE (1989), RICHER DE FORGES et al. (1984, 1986, 1987, 1990).

The programme of the MUSORSTOM cruises was extended to the neighbouring regions of New Caledonia: MUSORSTOM 7 took place in 1992 off the Wallis and Futuna Islands (RICHER DE FORGES & MENOU, 1993) and MUSORSTOM 8 off Vanuatu in 1994. Other cruises are planed in the forthcoming years in the French Polynesia and possibly off New Guinea.

In addition to the exploration cruises of the MUSORSTOM series, a programme for the assessment of resources of the seamounts in the economic zone around New Caledonia was undertaken by the ORSTOM Center in Noumea in 1990-91. During this program, 11 cruises (BERYX 1 to 11) allowed to collect complementary biological material because the gears used (bottom long lines, fish otter trawls, traps) were different from those currently used during the MUSORSTOM cruises (shrimp trawls, beam trawls and dredges). Reports on these cruises were published by: GRANDPERRIN et al. (1990, 1991, 1992), GRANDPERRIN & LEHODEY (1992), LEHODEY et al. (1992), LEHODEY (1994).

Furthermore, a special cruise (CALSUB) with the diving saucer "CYANA" took place in 1989 in the Loyalty trench between the islands of Pin and Lifou (The Loyalty Islands) in order to study the bathyal environment from the reef edge to about 300 m

Source : MNHN, Paris

Loyauté pour étudier l'environnement bathyal, depuis la bordure récifale jusqu'à environ 3000 m de profondeur (ROUX, 1994).

Les collections ichtyologiques constituées au cours de ces campagnes ont été déposées, pour la plupart, au Muséum national d'Histoire naturelle de Paris, pour être triées et confiées pour étude à des spécialistes. Une partie du matériel récolté au cours des campagnes BERYX a été déposée au musée de Wellington.

Au total, c'est plusieurs milliers de spécimens, appartenant à une centaine de familles, qui ont été mis en collection, principalement au MNHN, mais aussi dans d'autres institutions et musées pour la matériel étudié (cf. les matériels examinés dans les différentes contributions de ce volume). Si une partie des collections a été étudiée, ou est en cours d'étude, il reste de nombreuses familles disponibles. A ce jour, 26 collaborateurs ont accepté d'étudier les poissons de ces campagnes relevant de leur expertise, soit individuellement, soit en collaboration :

depth (ROUX, 1994).

The ichthyological collections made during these cruises were deposited to the "Muséum national d'Histoire naturelle" in order to be sorted out and dispatched to a number of ichthyologists for investigations. Part of the material collected during the BERYX cruises was deposited in the collections of the national Museum of New Zealand (Wellington).

As a result, several thousands of specimens of fish belonging to more than 100 families have been registered, mainly in the MNHN collections, but also, for the material which has been studied, in the collections of other institutions and museums (cf. material examined in the contributions of this volume). If part of this material has been studied, or currently under examination by several contributors, a number of families are still available for study. So far, 26 contributors accepted to study the fishes of these cruises depending on their own field of competence, either individually or in collaboration with other experts:

Kunio AMAOKA (Bothidae)
Adam BEN-TUVIA (Congridae du genre *Bathycongrus*)
Lluis DEL CERRO (Triglidae)
François CHAPLEAU (Soleidae, Samaridae, Poecilopsettidae)
Guy DUHAMEL (Macrorhamphosidae)
Ronald FRICKE (Callionymidae)
Tomio IWAMOTO (Macrouridae)
Leslie KNAPP (Platycephalidae)
Domènec LLORIS (Triglidae)
John McCOSKER (Ophichthidae)
Keiichi MATSUURA (Teraodontiformes)
Nigel MERRETT (Macrouridae)
Eiji MIHARA (Bothidae)
Thomas A. MUNROE (Cynoglossidae)
Jorgen NIELSEN (Ophidiiformes, *Ipnos*)
Christian NYAKO (Caproidae, Grammicolepididae, Macrurocyttidae, Zeidae, Oreosmoatidae)
Chris D. PAULIN (Moridae)
Stuart POSS (Scorpaenidae)
Jean-Claude QUÉRO (Congridae, Lophiidae, Ogcocephalidae)
Jacques RIVATON (Bothidae)
Clive D. ROBERTS (Moridae, Euclichthyidae, Gempylidae, Trachichthyidae)
Luis SALDANHA (Congridae, Lophiidae, Ogcocephalidae)
Bernard SÉRET (Chondrichthyes)
Andrew L. STEWART (Gempylidae)
Kenneth J. SULAK (Synaphobranchidae, Notacanthidae, Halosauridae, Chlorophthalmidae)
James TYLER (Tetraodontiformes)

Source : MNHN, Paris

Les poissons des premières campagnes (MUSORSTOM 1 à 3) aux Philippines ont été étudiés partiellement par : BOURRET (1986), FOURMANOIR (1981, 1986), LE DANOIS (1981). Le matériel provenant des campagnes néo-calédoniennes a fait l'objet de quelques publications : RIVATON (1989), AMAOKA & RIVATON (1991), AMAOKA *et al.* (1993) BEN-TUVIA (1993), FRICKE (1993), RIVATON (1989), SÉRET (1987, 1990, 1994a,b), STEHMANN (1989).

Le présent volume rassemble 8 contributions de 12 collaborateurs. Il comprend les descriptions de 85 espèces dont 16 sont nouvelles, représentant 49 genres et 15 familles (cf. « Liste des espèces de poissons décrites dans ce volume »). Il vient s'ajouter aux seize volumes déjà parus dans la série « Résultats des Campagnes MUSORSTOM » traitant principalement des invertébrés benthiques et qui constituent une exceptionnelle base de connaissances pour la compréhension de la bio-diversité bathyale.

Un second volume consacré aux poissons de profondeur est en préparation : il comprendra les contributions des collaborateurs cités plus haut.

The fishes of the first cruises (MUSORSTOM 1 to 3) off the Philippines have been partially studied by: BOURRET (1986), FOURMANOIR (1981, 1986), LE DANOIS (1981). The material collected during the New Caledonian cruises has been treated in a few publications: RIVATON (1989), AMAOKA & RIVATON (1991), AMAOKA et al. (1993) BEN-TUVIA (1993), FRICKE (1993), RIVATON (1989), SÉRET (1987, 1990, 1994a,b), STEHMANN (1989).

The present volume collects 8 contributions of 12 authors. It includes the descriptions of 85 species, 16 of which are new, representing 49 genera and 15 families (cf. "List of the fish species described in this volume" and is in addition to the 16 volumes already published in the series "Résultats des Campagnes MUSORSTOM" dealing mainly with benthic Invertebrates. This series represents an exceptionnal base of knowledge for a better understanding of the bathyal biodiversity.

A second volume dealing with the deep water fishes is in preparation: it will include contributions of authors listed above.

REMERCIEMENTS

Je remercie les organisateurs des campagnes MUSORSTOM, notamment Alain CROSNIER et Bertrand RICHER DE FORGES, qui m'ont confié la gestion des récoltes de poissons de profondeur de Nouvelle-Calédonie et l'organisation des études de ces récoltes.

La mise en valeur de l'exceptionnel matériel ichtyologique récolté au cours des campagnes n'a été possible que grâce aux contributions des collaborateurs qui ont bien voulu étudier le matériel ichtyologique de ces campagnes. Qu'ils en soient tous chaleureusement remerciés.

Mes remerciements vont également aux réviseurs qui ont corrigé et commenté les articles publiés dans ce volume.

ACKNOWLEDGMENTS

I thank the organizers of the MUSORSTOM cruises, mainly my ORSTOM colleagues Alain CROSNIER and Bertrand RICHER DE FORGES, who trusted me for the management of the deep water fish collections of New Caledonia and the organization of studies related to these collections.

The study of this exceptionnal ichthyological material was carried out thanks to the contributions of colleagues. They are all warmly thanked.

My sincerest thanks are extended to the referees who have reviewed the papers published in this volume.

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Source : MNHN, Paris

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ANNEXE / APPENDIX

LISTE DES ESPÈCES DE POISSON DÉCRITES DANS CE VOLUME
LIST OF THE FISH SPECIES DESCRIBED IN THIS VOLUME

(Les espèces nouvelles sont signalées en gras - *New species are in bold type*)

MORIDAE (par / by PAULIN & ROBERTS)
***Gadella brocca* sp. nov.**
Gadella norops Paulin, 1987
Laemonema filodorsale Okamura, 1982
Laemonema palauense Okamura, 1982
Lepidion inosimae (Günther, 1887)
Mora moro (Risso, 1810)
Physiculus longifilis Weber, 1913
Physiculus luminosus Paulin, 1983
Physiculus roseus Alcock, 1891
Physiculus therosideros Paulin, 1987
Tripterophycis svetovidovi Sazonov & Shcherbachev, 1986

EUCLICHTHYIDAE (par / by ROBERTS & PAULIN)
Euclichthys polynemus McCulloch, 1926

CARAPIDAE (par / by NIELSEN)
Pyramodon ventralis Smith & Radcliffe, 1913

OPHIDIIDAE (par / by NIELSEN)
Acanthonus armatus Günther, 1878
Alcockia rostrata (Günther, 1887)
Bassozetus elongatus Smith & Radcliffe, 1913
Bassozetus glutinosus (Alcock, 1890)
Bassozetus robustus Smith & Radcliffe, 1913
Bathyonus caudalis (Garman, 1899)
Dicrolene longimana Smith & Radcliffe, 1913
Homostolus japonicus Matsubara, 1943
Monomitopus garmani (Smith & Radcliffe, 1913)
***Neobythites bimaculatus* sp. nov.**
Neobythites bimarginatus Fourmanoir & Rivaton, 1979
***Neobythites longiventralis* sp. nov.**
***Neobythites neocaledoniensis* sp. nov.**
***Neobythites pallidus* sp. nov.**
Neobythites unimaculatus Smith & Radcliffe, 1913
***Neobythites zonatus* sp. nov.**
Ophidion muraenolepis (Günther, 1880)
Porogadus melampeplus (Alcock, 1896)
Pycnocraspedum squamipinne Alcock, 1889
Tauredophidium hextii Alcock, 1890

APHYONIDAE (par / by NIELSEN)
Aphyonus bolini Nielsen, 1974
Aphyonus gelatinosus Günther, 1878
***Parasciadonus pauciradiatus* sp. nov.**

MACRORHAMPHOSIDAE (par / by DUHAMEL)
Macrorhamphosus scolopax (Linnaeus, 1758)
Notopogon xenosoma Regan, 1914

TRIGLIDAE (par / by DEL CERRO & LLORIS)
PERISTEDIINAE
Paraheminodus murrayi (Günther, 1880)
Peristedion picturatum McCulloch, 1926
Satyrichthys moluccense (Bleeker, 1851)
Satyrichthys orientale (Fowler, 1938)
S. quadratorostratus (Fourmanoir & Rivaton, 1979)
TRIGLINAE
Lepidotrigla sp. cf. abyssalis Jordan & Starks, 1904
***Lepidotrigla alcocki vaubani* subsp. nov.**
***Lepidotrigla annamarae* sp. nov.**
Lepidotrigla grandis Ogilby, 1910
***Lepidotrigla musorstomi* sp. nov.**
***Lepidotrigla nana* sp. nov.**

Source : MNHN, Paris

***Lepidotrigla sereti* sp. nov.**
Parapterygotrigla megalops (Fowler, 1938)
Parapterygotrigla multiocellata Matsubara, 1937
Pterygotrigla macrolepidota (Kamohara, 1938)
Pterygotrigla picta (Günther, 1880)
***Pterygotrigla robertsi* sp. nov.**
Pterygotrigla tagala (Herre & Kauffman, 1952)

GEMPYLIDAE (par / by ROBERTS & STEWART)
***Rexea alisae* sp. nov.**
Rexea antefurcata Parin, 1989
Rexea bengalensis (Alcock, 1894)

BOTHIDAE (par / by AMAOKA, MIHARA & RIVATON)
***Tosarhombus brevis* sp. nov.**
***Tosarhombus longimanus* sp. nov.**
Tosarhombus neocaledonicus Amaoka & Rivaton, 1991
Parabothus coarctatus (Gilbert, 1905)
***Parabothus filipes* sp. nov.**
Parabothus kiensis (Tanaka, 1918)

TRIACANTHODIDAE (par / by MATSUURA & TYLER)
Bathyphylax bombifrons Myers, 1934
Halimochirurgus alcocki Weber, 1913
Macrorhamphosodes uradoi (Kamohara, 1933)
Paratriacanthodes retrospinis Fowler, 1934
Triacanthodes ethiops Alcock, 1894
Triacanthodes intermedius Matsuura & Fourmanoir, 1984

MONACANTHIDAE (par / by MATSUURA & TYLER)
Paramonacanthus japonicus (Tilesius, 1801)
Pseudalutarius nasicornis (Temminck & Schlegel, 1850)
Thamnaconus fijiensis Hutchins & Matsuura, 1984
Thamnaconus modestoides (Barnard, 1927)
Thamnaconus tessellatus (Günther, 1880)

ARACANIDAE (par / by MATSUURA & TYLER)
Kentrocapros flavofasciatus (Kamohara, 1938)

OSTRACIIDAE (par / by MATSUURA & TYLER)
Tetrosomus gibbosus (Linnaeus, 1758)

TRIODONTIDAE (par / by MATSUURA & TYLER)
Triodon macropterus Lesson, 1830

TETRODONTIDAE (par / by MATSUURA & TYLER)
Arothron firmamentum (Temminck & Schlegel, 1850)
Canthigaster callisterna (Ogilby, 1889)
Canthigaster rivulata (Temminck & Schlegel, 1850)
Sphoeroides pachygaster (Müller & Troschel, 1848)
Torquigener brevipinnis (Regan, 1902)
Tylerius spinosissimus (Regan, 1908)

Source : MNHN, Paris

2

Review of the morid cods (Teleostei, Paracanthopterygii, Moridae) of New Caledonia, southwest Pacific Ocean, with description of a new species of *Gadella*

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ABSTRACT

Morid cods, family Moridae, of the New Caledonian Exclusive Economic Zone are reviewed based on fresh specimens obtained during exploratory fishing by ORSTOM and preserved specimens held in research collections in Paris, Nouméa and Wellington. The following eleven species in six genera are described: *Gadella brocca* new species, endemic; *Gadella norops* Paulin, southern Indian Ocean and southwestern Pacific Ocean; *Laemonema filodorsale* Okamura, new record, western Pacific; *Laemonema palauense* Okamura, western Pacific Ocean; *Lepidion inosimae* (Günther), new record, western Pacific Ocean; *Mora moro* (Risso), new record, northwest Atlantic Ocean, Mediterranean Sea, southern Indian Ocean and South Pacific Ocean; *Physiculus longifilis* Weber, new record, Flores Sea and northern Australia; *Physiculus luminosus* Paulin, new record,.

PAULIN, C. D. & C. D. ROBERTS, 1997. — Review of the morid cods (Teleostei, Paracanthopterygii, Moridae) of New Caledonia, with description of a new species of *Gadella*. *In*: SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 17-41. Paris ISBN 2-85653-500-3.

Source : MNHN, Paris

South Pacific Ocean; *Physiculus roseus* Alcock, new record, Indian Ocean, South China Sea, Phillipines; *Physiculus therosideros* Paulin, southwestern Pacific Ocean; *Tripterophycis svetovidovi* Sazanov & Shcherbachev, new record, warm temperate South Atlantic, Indian and Pacific Oceans. A key to the species is provided.

RÉSUMÉ

Révision des moridés (Teleostei, Paracanthopterygii, Moridae) de Nouvelle-Calédonie (Océan Pacifique Sud-Ouest), avec la description d'une espèce nouvelle du genre *Gadella*.

Les poissons de la famille des Moridae provenant de la Zone Économique Exclusive de Nouvelle-Calédonie sont révisés en se basant sur des spécimens frais, capturés lors des campagnes d'exploration de l'ORSTOM, et sur des spécimens fixés provenant des collections de Paris, Nouméa et Wellington. Onze espèces appartenant à six genres sont décrites. Une espèce est endémique et nouvelle : *Gadella brocca* n. sp. Trois espèces ont déjà été répertoriées dans la région: *Gadella norops* Paulin, présente dans le sud de l'Océan Indien et le Pacifique Sud-Ouest ; *Laemonema palauense* Okamura, signalée dans l'ouest du Pacifique ; et *Physiculus therosideros* Paulin, présente dans le sud-ouest du Pacifique. Sept espèces sont signalées pour la première fois dans la région : *Laemonema filodorsale* Okamura et *Lepidion inosimae* (Günther), présentes dans le Pacifique Ouest ; *Mora moro* (Risso), de l'Atlantique Nord-Ouest, de la Méditerranée, du sud de l'Océan Indien et du Pacifique Sud ; *Physiculus longifilis* Weber, d'Indonésie et du nord de l'Australie; *Physiculus luminosus* Paulin, du Pacifique Sud ; *Physiculus roseus* Alcock, de l'Océan Indien et du nord de l'Australie ; *Tripterophycis svetovidovi* Sazanov & Shcherbachev, des eaux tempérées chaudes du sud de l'Océan Atlantique, Océan Indien et du Pacifique Sud. Une clef des espèces est jointe à cette étude.

INTRODUCTION

The 200 mile Exclusive Economic Zone (EEZ) of New Caledonia covers an area of over 1.7 million km^2 and contains a complex and varied seabed morphology including coral reefs, seamounts and deep ocean basins. There is, therefore, a great diversity of habitats and associated fauna, particularly fishes, present in the zone. However, the fish fauna of the region has received little attention, until recently. Since the late 1970's, fish collecting has been carried out as part of exploratory research programmes run by ORSTOM Nouméa, ORSTOM Paris and the Muséum National d'Histoire Naturelle, Paris, in both lagoon and deep water, including offshore seamounts (RICHER DE FORGES, 1990). Morid cods have been present in many of the deep water collections, but difficulties associated with their superficially similar morphology and inadequate taxonomic treatment, has frequently hindered accurate identification.

As part of cooperative research programmes between ORSTOM Centre de Nouméa and the Museum of New Zealand Te Papa Tongarewa (formerly the National Museum of New Zealand), morids were observed and collected by the authors who participated in exploratory deep water fishing on seamounts during R. V. *"Alis"* cruises BERYX 2 and BERYX 11. Also, preserved specimens collected during recent research cruises in the New Caledonian EEZ and held by ORSTOM Nouméa, ORSTOM Paris and the Muséum National d'Histoire Naturelle, Paris, were studied. This new material provides the basis for the present review and enables the morid cods of New Caledonia to be critically treated for the first time.

METHODS

Counts and measurements follow the methods used by HUBBS & LAGLER (1964) and PAULIN (1983), accurate counts of scale rows from damaged specimens are difficult to make and these approximate data are denoted by "ca." in the text, and vertebral counts exclude both ural centra. Morphometric data in the text are expressed as ranges and are given in mm, with percent standard length in parentheses. Otolith morphology has been found to be useful in identifying morid genera (KARRER, 1971; FITCH & BARKER, 1972; PAULIN, 1983) and, therefore, otoliths were sampled where possible in the present study. Otoliths were removed from freshly thawed specimens when

Source : MNHN, Paris

available, cleaned, stored dry, illustrated and described; otolith nomenclature follows KARRER (1971). Synonymies include valid name, primary synonyms, and New Caledonian, Australian and New Zealand nomenclature. Specimens examined are listed under each species account, the number of specimens is given and those specimens X-rayed are denoted by an asterisk. The Eucla cod, family Euclichthyidae, is similar to morid cods in body shape and appearance, however, several internal characters (COHEN, 1984) indicate that it is only distantly related and it is, therefore, reviewed separately (ROBERTS & PAULIN, this volume).

Institutional abbreviations follow the international standards fixed by LEVITON *et al.* (1985).

SYSTEMATIC ACCOUNT

Family **MORIDAE**

NOTE: the family Moridae is herein used *sensu* PAULIN (1989).

DIAGNOSIS. — Gadiform fishes with symmetrical anal fin (either single or divided into two equal portions), symmetrical caudal fin, a horizontal diaphragm within the posterior chamber of the swim bladder (PAULIN, 1988), swim bladder-auditory capsule connection present, caudal skeleton with four or five hypurals and X-Y bones, a jointed first neural spine, and a double sulcus groove present on otoliths.

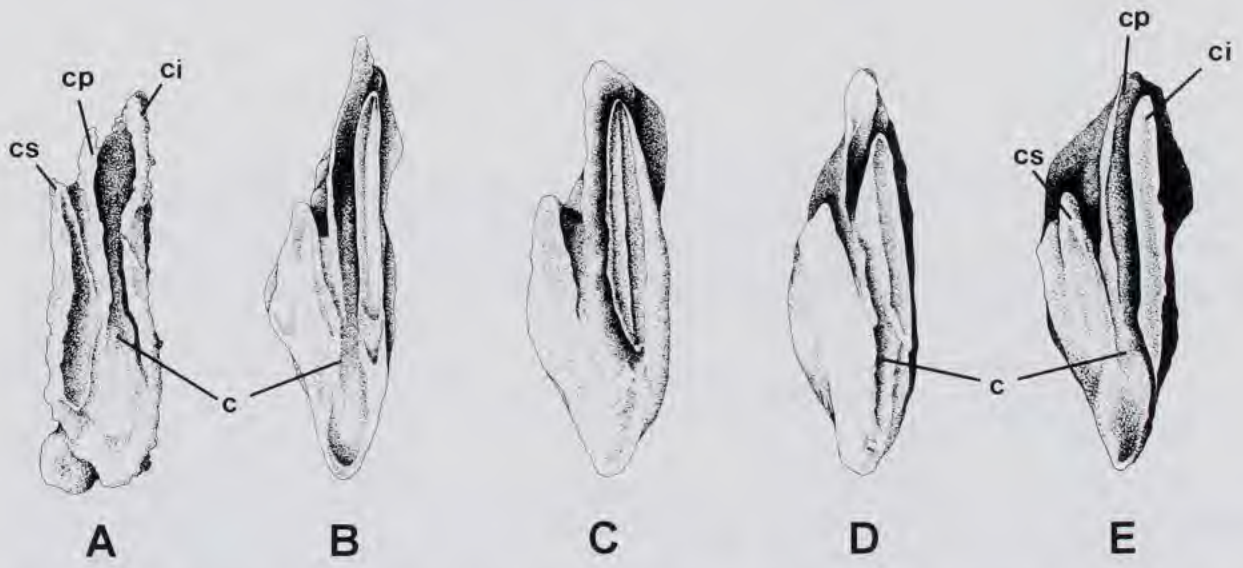

FIG. 1. — Otoliths from New Caledonian morids; left otolith in medial view. — **A**: *Lepidion inosimae* (Günther, 1887), specimen of 605 mm SL (MNHN 1995-000), otolith length 23.5 mm. — **B**: *Gadella norops* Paulin, 1987, specimen of 228 mm SL (NMNZ-P.27491), otolith length 9.0 mm. — **C**: *Laemonema filodorsale* Okamura, 1982, specimen of 235 mm SL (NMNZ-P.27423), otolith length 11.2 mm. — **D**: *Physiculus therosideros* Paulin, 1987, specimen of 165 mm SL (NMNZ-P.27454), otolith length 9.3 mm. — **E**: *Trypterophycis svetovidovi* Sazanov & Shcherbachev, 1986, specimen of 233 mm SL (NMNZ-P.27443), otolith length 7.5 mm. Abbreviations: c, collum; ci, crista inferior; cp, colliculum posterior; cs, crista superior.

Source : MNHN, Paris

REMARKS. — Moridae intrarelationships are poorly understood. The family Euclichthyidae, comprising the monotypic *Eucla* cod, is superficially similar to morid cods and has been proposed as the sister family (MARKLE, 1989: fig. 19), but other workers using mostly different characters have found conflicting results. COHEN (1984) indicated that the two families are only distantly related; HOWES (1989: fig. 10) concurred, and proposed the Bathygadidae as the morid sister group.

The family Moridae comprises about 17 genera and 95 species (PAULIN, 1989a; COHEN *et al.*, 1990). Morids are benthopelagic to pelagic at 0-2,500 m depth, are found in all oceans, and some are commercially important. In the New Caledonian region morids are an important component of deep slope and seamount fish faunas. In the present review, 11 species in six genera are described and the otoliths of five species are illustrated (Fig. 1), four of these for the first time.

Genus ***GADELLA*** Lowe, 1843

Gadella Lowe, 1843: 91 (feminine, type species *Gadella gracilis* Lowe by monotypy).

DIAGNOSIS. — Morid fishes with thick, pointed, spindle shaped otoliths (ostium one third or less of otolith length) (Fig. 1B); a small ventral light organ in advance of the anus; two dorsal fins and one anal fin; ventral fins with outer two rays filamentous; barbel absent.

REMARKS. — Related to *Physiculus* Kaup and *Salilota* Günther on the basis of shared otolith and light organ specializations (PAULIN, 1989a; 1989b); comprising nine species occurring in subtropical and tropical seas worldwide, some restricted in distribution to island chains and submarine ridges.

Gadella brocca sp. nov.

Fig. 2, Table 1

MATERIAL EXAMINED. — 5 specimens, 100.0-172.5 mm SL.

Norfolk Ridge. AZTÈQUE: stn 7, 23°37.5'S, 167°42.1'E (Stylaster seamount, southeast of New Caledonia), 425-500 m depth, otter trawl, R. V. *"Alis"*, 14 February 1990: holotype, 172.5 mm SL (MNHN 1995-1002)*.

New Caledonia. BATHUS 1: stn 660, 21°10.48'S, 165°53.19'E (off central west coast Grande Terre), 790 m depth, beam trawl, R. V. *"Alis"*, 13 March 1993: 3 paratypes, 100.0-131.5 mm SL (MNHN 1995-1003)*. — 1 specimen, 143 mm SL (NMNZ-P.31380)*, same data as other 3 paratypes.

DIAGNOSIS. —A species of *Gadella* with a single row of large, irregular canine-like teeth in upper and lower jaws and a small triangular patch of minute teeth at symphysis of lower jaw; eye small, orbit diameter 4.7-5.3 % SL; interorbital broad, 5.1-8.6 % SL.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly longer than diameter of eye. Teeth in a single row, large, irregular canine-like, in upper and lower jaws and a small triangular patch of minute teeth at symphysis of lower jaw. First dorsal fin origin behind pectoral insertion, first ray minute, second longest. Second dorsal fin commences immediately behind first, posterior fin rays longest. Anal fin commences immediately behind anus, height only slightly depressed along middle of its length and posterior fin rays longest. Caudal fin rounded. Pelvic fins just reaching anus. Ventral light organ minute, placed slightly in advance of anus, well behind pelvic fin insertions.

Measurements and *meristics*. Morphometric and meristic characters of the holotype and four paratypes are given in Table 1.

Source : MNHN, Paris

Coloration (from preserved specimens). Upper half of head and body pale creamish tan, lower portion dark bluish grey; lips, branchiostegal membranes, orbit rim, insertion of pectoral and pelvic fins, light organ and anus black; dorsal and anal fins black; caudal and paired fins greyish blue; remaining scale pockets black.

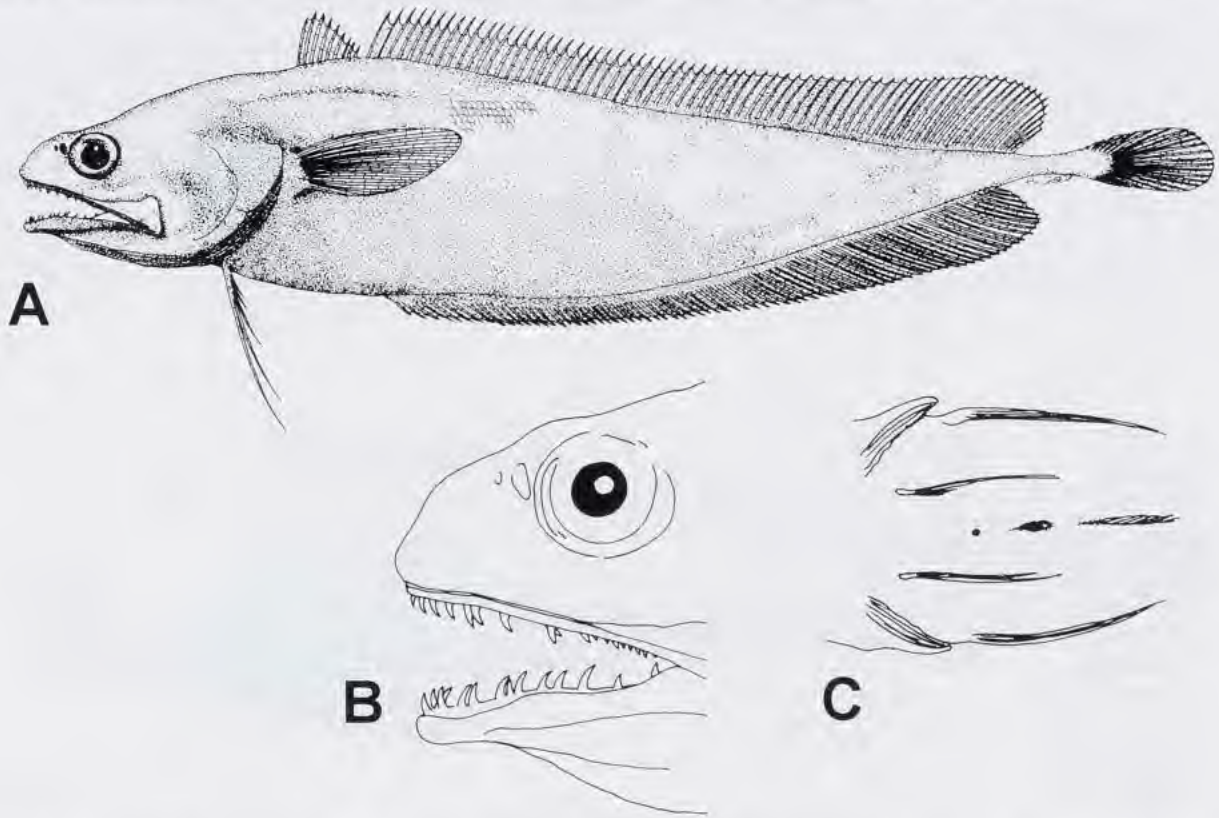

FIG. 2. — *Gadella brocca* sp. nov., holotype, 172.5 mm SL (MNHN 1995-1002), Stylaster seamount, southeast of New Caledonia, 425-500 m depth, AZTEQUE, stn 7. — **A**: whole fish in left lateral view. — **B**: lateral view of head, showing teeth on jaws. — **C**: ventral view of light organ.

DISTRIBUTION. — Known from five specimens, one taken on the Stylaster seamount southeast of New Caledonia at 425-500 m depth (GRANDPERRIN *et al.*, 1990), and four off the central west coast of Grande Terre, New Caledonia, at 790 m depth.

REMARKS. — *Gadella brocca* n. sp. differs in its dentition from other known species of the genus occurring within the Indo-Pacific region: *G. edelmanni* (Brauer), *G. filifer* (Garman), *G. norops* Paulin, *G. obscurus* (Parin), and *G. jordani* (Boehlke & Mead); *G. brocca* has a single row of large, irregular prominent teeth in both jaws (Fig. 2B), all other species in the Indo-Pacific region have a band of villiform teeth in 4-9 rows (PAULIN, 1989b). The dentition of *G. brocca* is similar to that of *G. imberbis* (Vaillant) (Caribbean Sea and tropical Atlantic Ocean) and *G. maraldi* (Risso) (Mediterranean Sea and Northeast Atlantic Ocean) (PAULIN, 1989b; COHEN *et al.*, 1990). *Gadella brocca* differs from these two latter species in having a single row of caniniform teeth on both jaws (vs bands of villiform teeth on both jaws, and some caniniform teeth only on upper jaws). *Gadella brocca* further differs from *G. maraldi* in eye diameter (4.7-5.3% SL vs 6.8-7.9% SL). PAULIN (1989b: 130) distinguished two groups of *Gadella*: Indo-Pacific species with small light organs, undifferentiated bands of villiform teeth, and higher numbers of fin rays, vertebrae and scales; and Atlantic species with two rows of differentiated villiform and caniniform teeth, lower meristic counts, and larger light organs. With the exception of its dentition, *G. brocca* falls into the first group. However, its teeth are sufficiently different in configuration and position from those in the Atlantic group to suggest independent origin.

Source : MNHN, Paris

ETYMOLOGY. — From Latin *broccus* (projecting teeth) in reference to the prominent dentition.

TABLE 1. — Morphometric and meristic characters of type specimens of *Gadella brocca* sp. nov. from New Caledonia. (D = damaged).

	Holotype MNHN 1995-1002		Paratype NMNZ P.31380		Paratype MNHN 1995-1003		Paratype MNHN 1995-1003		Paratype MNHN 1995-1003		Min - Max
Standard length (mm)	172.5		143.0		131.5		127.0		100.0		100.0-172.5
MORPHOMETRIC CHARACTERS in mm and % SL	mm	%	mm	%	mm	%	mm	%	mm	%	%
Head length	45.6	26.4	27.0	18.8	25.5	19.4	25.0	19.6	17.3	17.3	17.3-26.4
Head width	30.5	17.7	18.5	13.2	14.3	10.8	14.5	11.4	11.1	11.1	10.8-17.7
Body depth	31.8	18.4	24.0	16.7	20.0	15.2	18.4	14.4	15.9	15.9	14.4-18.4
Caudal peduncle depth	2.9	1.7	1.8	1.2	1.7	1.2	1.3	1.0	1.4	1.4	1.0-1.7
Orbit diameter	9.0	5.2	6.8	4.7	7.1	5.3	6.2	4.8	5.0	5.0	4.7-5.3
Interorbital width	14.9	8.6	7.3	5.1	7.0	5.3	6.6	5.1	6.4	6.4	5.1-8.6
Snout length	11.0	6.4	6.9	4.8	5.8	4.4	7.0	5.5	5.1	5.1	4.4-6.4
Maxilla length	27.1	15.7	13.5	9.4	12.1	9.2	12.5	9.8	9.6	9.6	9.2-15.7
Pectoral fin length	30.0	17.4	22.1	15.4	18.0	13.6	21.1	16.5	17.6	17.6	13.6-17.6
Pelvic fin length	14.4	8.3	7.8	5.4	D	-	5.1	4.0	D	-	4.0-8.3
Longest ray of D_1 length	12.5	7.2	4.3	3.0	6.1	4.6	4.5	3.5	5.2	5.2	3.0-7.2
Longest ray of D_2 length	11.0	6.8	7.6	5.3	10.0	7.6	9.8	7.7	7.3	7.3	5.3-7.7
Longest anal fin ray length	11.9	6.9	7.9	4.8	10.1	7.6	8.9	7.0	7.9	7.9	4.8-7.9
Predorsal length	48.5	28.1	35.0	24.4	35.0	26.6	26.8	21.1	24.4	24.4	21.1-28.1
Preanal length	62.1	36.0	40.5	28.3	38.5	29.2	42.6	33.5	35.0	35.0	28.3-36.0
Light organ diameter	1.0	0.6	0.9	0.6	0.8	0.6	D	-	D	-	0.6-0.6
Light organ - interpelvic length	12.0	7.0	10.5	7.3	8.1	6.1	D	-	D	-	6.1-7.3
MERISTIC CHARACTERS											
First dorsal fin rays	1 + 9		1 + 8		1 + 9		1 + 9		1 + 9		1 + 8-9
Second dorsal fin rays	70		73		75		71		74		70-75
Anal fin rays	77		78		77		78		77		77-78
Pectoral fin rays	25		25		26		26		25		25-26
Pelvic fin rays	5		6		6		6		6		5-6
Gill rakers	4 + 10		4 + 12		3 + 9		4 + 10		4 + 10		3-4 + 9-12
Longitudinal scale rows	ca. 90		ca. 94		D		D		D		ca. 90 - ca. 94
Vertebrae (excl. ural centra)	57		55		57		56		56		55-57

Source : MNHN, Paris

Gadella norops Paulin, 1987

Fig. 3

Gadella norops Paulin, 1987: 75 (original description, Port Hedland, Western Australia); 1989b: 101, figs 4-5 (description).

MATERIAL EXAMINED. — 6 specimens, 193.5-268.0 mm SL.

Norfolk Ridge. BERYX 2: stn 18, 24°56.4'S, 168°21.0'E (Seamount "B"), 564-586 m depth, otter trawl, R. V. *"Alis"*, 30 October 1990: 1 specimen (NMNZ-P.27491)*.

AZTEQUE: stn 1, 23°13.3'S, 168°04.6'E (Azteque Seamount), 290-460 m depth, otter trawl, R. V. *"Alis"*, 12 February 1990: 2 specimens (MNHN 1995-1004). — Stn 4, 23°42.5'S, 168°01.2'E (Jumeaux seamount), 235-400 m depth, otter trawl, 13 February 1990: 3 specimens (MNHN 1995-1005).

DIAGNOSIS. — A species of *Gadella* with a band of villiform teeth in both upper and lower jaws; light organ small; dorsal fin not elongate; second dorsal fin rays 70-77 (cf. 72-77, PAULIN, 1987); width of interorbital 6.8-10.7% SL (cf. greater than 7.9% SL PAULIN, 1987).

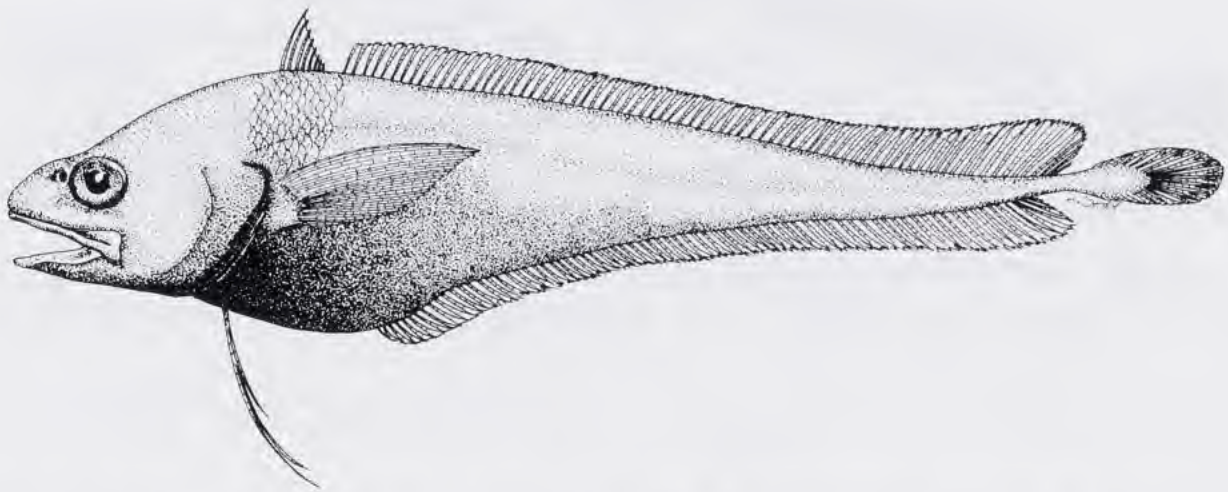

FIG. 3. — *Gadella norops* Paulin, 1987, specimen of 228 mm SL (NMNZ-P.27491), seamount "B", southeast of New Caledonia, 564-586 m depth, BERYX 2, stn 18.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, longer than diameter of eye. Teeth villiform, in bands on upper and lower jaws. First dorsal fin origin behind pectoral insertion, first ray minute, second longest. Second dorsal commences immediately behind first, height greatest at posterior. Anal fin commences immediately behind anus, height only slightly depressed along middle of its length, greatest height of fin posteriorly (around rays 60-65). Caudal fin rounded. Pelvic fins reaching beyond anus to about tenth anal fin ray.

Measurements (in mm, % SL in parenthesis). Standard length 193.5-268.0; head length 39.8-58.3 (21.4-28.6), width 23.1-39.8 (10.7-17.0); body depth 30.0-51.2 (12.7-21.8); caudal peduncle depth 3.1-5.1 (1.4-2.1); orbit diameter 8.3-10.6 (3.5-4.5); interorbital width 16.1-28.7 (6.8-10.7); snout length 13.4-18.8 (5.6-8.1); maxilla length 24.5-31.1 (10.6-13.2); length of pectoral fin 33.2-50.6 (16.9-19.4); length of pelvic fin 33.8-57.2 (14.8-21.3); length of longest ray of first dorsal 8.0-21.0 (3.3-8.9), second 19.2-29.2 (8.9-12.6); length of longest ray of anal fin 17.1-25.1 (7.7-9.7); predorsal length 55.2-66.8 (25.1-28.5); preanal length 65.0-85.2 (28.7-36.4).

Source : MNHN, Paris

Meristics. First dorsal fin rays 1 + 8-9; second dorsal fin rays 70-76; anal fin rays 70-73; pectoral fin rays 19-23; pelvic fin rays 5-6; oblique scale rows in longitudinal series ca. 127-129; gill rakers 4-5 + 10-13; vertebrae 59-61.

Coloration (from fresh and frozen specimens). Lower head and abdomen dark blue-black, sides silvery, dorsal surface dark tan, fins pinkish.

Coloration (from preserved specimens). Body pale tan with darker scale pockets, lower head and abdomen dark blue-black, silvery patch at pectoral insertion, fins pale tan to dusky.

DISTRIBUTION. — *Gadella norops* is the most widely distributed species in the genus *Gadella* and is known from scattered locations in the Indo-Pacific region, occurring from the Mascarene Ridge off India, to Australia, New Caledonia and New Zealand at 200-750 m depth (PAULIN, 1989b).

REMARKS. — *Gadella norops* can be distinguished from the sympatric *G. brocca* by its dentition consisting of bands of villiform teeth in both jaws, rather than a single row of large irregular caniniform teeth.

Genus ***LAEMONEMA*** Günther *in* Johnson, 1862

Laemonema Günther *in* Johnson, 1862: 171 (neuter, type species *Laemonema robustum* Johnson by monotypy).

DIAGNOSIS. — Morid fishes with blunt spindle shaped otoliths (Fig. 1C); two dorsal fins, the first short based, the second and the single anal fin long based; no ventral light organ; pelvic fins reduced to two long rays.

REMARKS. — A poorly known genus that is probably polyphyletic; comprising 18 poorly known species that are benthopelagic on continental slopes and oceanic ridges in tropical and temperate seas worldwide; some with limited distributions (PAULIN, 1989a; COHEN *et al.*, 1990).

Laemonema filodorsale Okamura, 1982

Fig. 4

Laemonema filodorsale Okamura, 1982: 133, pl. 82 (original description, Kyushu-Palau Ridge, Pacific Ocean).

MATERIAL EXAMINED. — **Norfolk Ridge**. BERYX 2: stn 3, 24°55.2'S, 168°21.0'E (Seamount "B"), 561-588 m depth, otter trawl, R. V. *"Alis"*, 24 October 1990: 1 specimen, 231 mm SL (NMNZ-P.27423)*.

DIAGNOSIS. — A species of *Laemonema* with enlarged conical teeth in outer series of both jaws; snout scaled dorsally; two dorsal fins separated at base, second dorsal ray prolonged; pelvic fins barely reaching anus; 51-56 second dorsal fin rays.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Barbel present on chin. Teeth villiform, in bands on jaws, a small rounded patch on vomer. First dorsal fin origin behind pectoral insertion, first ray minute, second longest, about two thirds length of head. Second dorsal commences immediately behind first, height more or less uniform throughout its length. Anal fin commences immediately behind anus, height depressed along middle of its length. Caudal fin slightly rounded. Pelvic fins reduced to two long rays, just reaching to level of anus.

Measurements (in mm, % SL in parenthesis). Standard length 231.0; head length 61.4 (26.5), width 37.0 (16.0); body depth 53.1 (22.9); caudal peduncle depth 5.6 (2.4); orbit diameter 16.4 (7.1); interorbital width 8.6 (3.7); snout length 12.4 (5.3); maxilla length 29.5 (12.7); length of pectoral fin 45.8 (19.8); length of pelvic fin

Source : MNHN, Paris

53.4 (23.1); length of longest ray of first dorsal 44.1 (19.0), second 20.5 (8.8); length of longest ray of anal fin 21.0 (9.0); predorsal length 68.0 (29.4); preanal length 110.0 (47.6).

Meristics. First dorsal fin rays 1 + 5; second dorsal fin rays 54; anal fin rays 51; pectoral fin rays 25; pelvic fin rays 2; oblique scale rows in longitudinal series 127; gill rakers 5 + 14; vertebrae 52.

Coloration (from fresh and frozen specimens). Head and body pale pink, darker pink along midline and around suboperculum, remaining scale pockets dark greyish brown. First dorsal fin greyish black with the first ray white; second dorsal fin greyish black with thin band of white marginally; anal fin dark grey, pale pink anteriorly, basally and at margin; caudal fin dark grey with thin white margin; pectoral fin dark grey, rays with reddish tips.

Coloration (from preserved specimens). Head and body pale, snout and orbit brown. Fins brownish with pale margins.

FIG. 4. — *Laemonema filodorsale* Okamura, 1982, specimen of 231 mm SL (NMNZ-P.27423), seamount "B", southeast of New Caledonia, 561-588 m depth, BERYX 2, stn 3.

DISTRIBUTION. — *Laemonema filodorsale* has an anti-equatorial distribution in the western Pacific Ocean; it is known from a small number of specimens taken on the Kyushu-Palau Ridge (OKAMURA, 1982) and off New Caledonia (this study) at 336-710 m depth.

REMARKS. — OKAMURA (1982) noted this species occurred sympatrically with *L. palauense*, but at different depths. However, the depth ranges given by OKAMURA and those found during the present study show great overlap between the two species (e.g., *L. filodorsale* 336-710 m, cf. *L. palauense* 210-753 m). The two species require critical comparison when additional specimens are collected. This is the first record of the species from New Caledonia.

Laemonema palauense Okamura, 1982

Fig. 5

Laemonema palauense Okamura, 1982: 137, pl. 83 (original description, Kyushu-Palau Ridge, Pacific Ocean).
Laemonema palauense: RIVATON *et al.*, 1989: 52 (listed).

MATERIAL EXAMINED. — 8 specimens, 77.6-276.0 mm SL.

Source : MNHN, Paris

New Caledonia. BIOCAL, stn CP 84, 20°43.49'S, 167°00.27'E (north of Lifou Island), 150-210 m depth, beam trawl, R. V. *"Jean Charcot"*, 6 September 1985: 1 specimen (MNHN 1995-1006)*.

MUSORSTOM 4: stn CP 172, 19°01.20'S, 163°16.00'E (off Belep Islands, north of New Caledonia), 275-330 m depth, beam trawl, R. V. *"Vauban"*, 17 September 1995: 1 specimen (MNHN 1995-1007)*. — Stn CP 238, 22°13.00'S, 167°14.00'E (off Grande Terre, southeast New Caledonia), 500-510 m depth, beam trawl, 2 October 1985: 1 specimen (MNHN 1995-1008)*.

Norfolk Ridge. SMIB 3: stn CP 4, 24°54.00'S, 168°21.5'E (seamount "B"), 530 m depth, beam trawl, R. V. *"Vauban"*, 20 May 1987: 1 specimen (MNHN 1995-1009)* . — Stn DW 7, 24°54.6'S, 168°21.3'E (seamount "B"), 505 m depth, Waren dredge, 21 May 1987: 1 specimen (MNHN 1995-1010)*.

BERYX 3: stn 9, 24°43.29'S, 170°07.52'E (seamount "K"), 719-753 m depth, bottom longline, R. V. *"Alis"*, 5 December 1991: 1 specimen (MNHN 1995-1011)*.

BERYX 11: stn 8, 24°52.6'S, 168°21.6'E (seamount "B"), 540-570 m depth, beam trawl, R. V. *"Alis"*, 5 October 1992: 2 specimens (NMNZ-P. 29057)*.

DIAGNOSIS. — A species of *Laemonema* with enlarged teeth in outer series of both jaws; snout naked dorsally; two dorsal fins joined by membrane at base, second dorsal ray slightly prolonged; pelvic fins reaching beyond anus; 61-65 second dorsal fin rays.

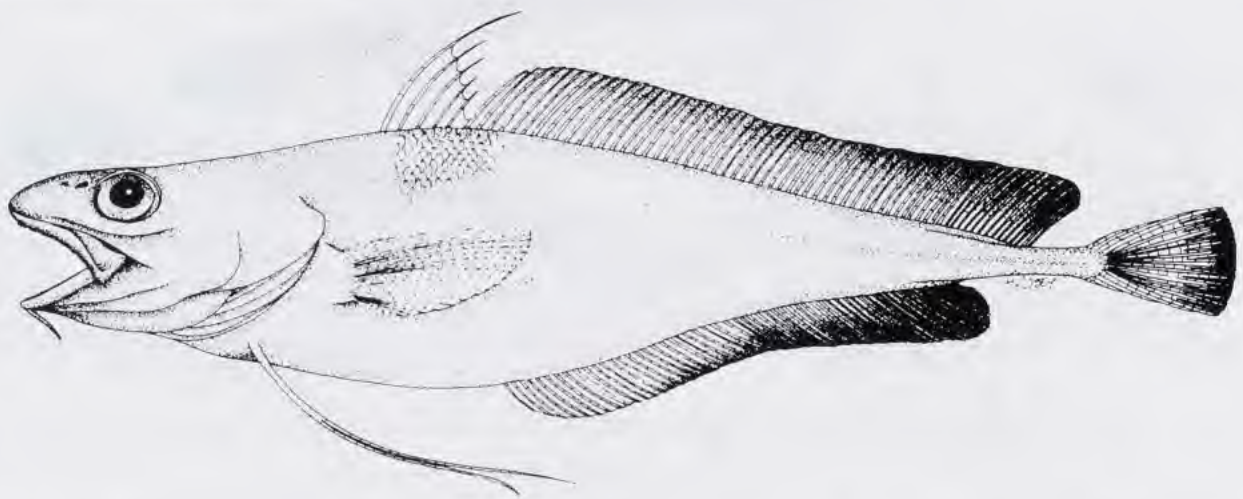

FIG. 5. — *Laemonema palauense* Okamura, 1982, specimen of 267 mm SL (MNHN 1995-1011), seamount "K", southeast of New Caledonia, 719-753 m depth, BERYX 3, stn 9.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Barbel present on chin. Teeth villiform, in bands on jaws, a small rounded patch on vomer. First dorsal fin origin behind pectoral insertion, first ray minute, second longest, about half length of head. Second dorsal commences immediately behind first, height more or less uniform throughout its length. Anal fin commences immediately behind anus, height depressed along middle of its length. Caudal fin slightly rounded. Pelvic fins reduced to two long rays, reaching to beyond level of anus.

Measurements (in mm, % SL in parenthesis). Standard length 77.6-267.0; head length 18.6-68.4 (23.9-25.6), width 9.7-39.1 (12.5-14.6); body depth 13.4-68.2 (17.2-25.5); caudal peduncle depth 2.0-6.5 (1.8-2.4); orbit diameter 4.7-17.6 (5.6-6.5); interorbital width 3.2-9.1 (3.9-4.1); snout length 5.7-14.5 (6.3-7.2); maxilla length 9.1-32.3 (10.9-14.1); length of pectoral fin 15.7-46.5 (17.7-20.3); length of pelvic fin 20.5-57.6 (23.4-26.4); length of longest ray of first dorsal 6.1-41.4 (7.8-18.1), second 6.0-22.8 (7.7-10.0); length of longest ray of anal fin 5.1-17.6 (6.5-7.7); predorsal length 22.2-67.8 (26.7-29.7); preanal length 29.5-110.0 (38.0-48.2).

Meristics. First dorsal fin rays 1 + 4-5; second dorsal fin rays 61-63; anal fin rays 59-63; pectoral fin rays 22-23; pelvic fin rays 2; oblique scale rows in longitudinal series ca. 115- ca. 118; gill rakers 4 + 16-18; vertebrae 52-53.

Source : MNHN, Paris

Coloration (from preserved specimens). Head and body uniform pale tan, abdomen faintly silvery; snout and remaining scale pockets brown. Vertical fins pale except for dark brown margin on dorsal, caudal and posterior two thirds of anal; paired fins colourless.

DISTRIBUTION. — *Laemonema palauense* is known from the western Pacific Ocean from two disjunct, anti-equatorial, populations on the Kyushu-Palau Ridge (OKAMURA, 1982) and off New Caledonia (RIVATON *et al.*, 1989; this study) at 210-753 m depth.

REMARKS. — See *Laemonema filodorsale*.

Genus ***LEPIDION*** Swainson, 1838

Lepidion Swainson, 1838: 318 (neuter, type species *Gadus lepidion* Risso by monotypy).

DIAGNOSIS. — Morid fishes with blunt otoliths with a cup shaped expansion of the crista inferior (Fig. 1A); chin barbel present; longest ray of first dorsal fin enlarged, greater than length of head; anal fin deeply indented at mid-length; light organ absent.

REMARKS. — Nine poorly known species recognized, benthopelagic at 500-1,200 m depth in temperate and subtropical waters of all oceans (PAULIN, 1983; 1989a; COHEN *et al.*, 1990).

Lepidion inosimae (Günther, 1887)

Fig. 6

Haloporphyrus inosimae Günther, 1887: 92, fig. 92 (original description, Inosimae, Japan).

Lepidion inosimae: PAULIN, 1989: 59 (synonymy, description). — PAXTON & HANLEY, 1989: 300 (synonymy, first Australian record).

MATERIAL EXAMINED. — 2 specimens, 425.0-605.0 mm SL.

Norfolk Ridge. Stn 21-2, 24°44'S, 170°06.0'E, 805 m depth, bottom longline, F. V. *"Humbold"*, 11 June 1991: 1 specimen, 605.0 mm SL (MNHN 1995-1012).

BERYX 3: stn 8, 24°44.5'S, 170°08.8'E (seamount "K", southeast of New Caledonia), 797-800 m depth, bottom longline, R. V. *"Alis"*, 4 December 1991: 1 specimen, 425 mm SL (MNHN 1995-1013).

DIAGNOSIS. — A species of *Lepidion* with more than 200 oblique scale rows in longitudinal series, and teeth on vomer in a rounded patch.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly longer than diameter of eye. Barbel present on chin. Teeth villiform, a rounded patch on vomer. First dorsal fin origin behind pectoral insertion, first ray minute, second longest, greater than length of head. Second dorsal commences immediately behind first, height more or less uniform throughout its length. Anal fin commences immediately behind anus, height depressed along middle of its length. Caudal fin truncated. Pelvic fins not reaching anus.

Measurements (in mm, % SL in parenthesis). Standard length 425.0-605.0; head length 108.5-158.4 (25.5-26.1), width 61.2-93.1 (14.4-15.3); body depth 85.0-148.5 (20.0-24.5); caudal peduncle depth 12.0-19.5 (2.8-3.2); orbit diameter 22.1- 28.4 (4.6-5.2); interorbital width 17.6-34.5 (4.1-5.7); snout length 30.5-47.6 (7.1-7.8); maxilla length 51.5-74.1 (12.1-12.2); length of pectoral fin 63.0-88.0 (14.5-14.8); length of pelvic fin broken- 155.0 (25.6);

Source : MNHN, Paris

length of longest ray of first dorsal 205.0-240.0 (39.6-48.2), second 38.5-51.0 (8.4-9.0); length of longest ray of anal fin 37.5-54.0 (8.8-8.9); predorsal length 107.5-134.0 (22.1-25.2); preanal length 200.0-300.0 (47.0-49.5).

Meristics. First dorsal fin rays 1 + 5; second dorsal fin rays 55-58; anal fin rays 49-52; pectoral fin rays 21; pelvic fin rays 7; oblique scale rows in longitudinal series ca. 201-208; gill rakers 3-4 + 8-11; vertebrae 56-58.

Coloration (from preserved specimens). Head and body greyish, slightly paler ventrally; vertical fins dark distally; tip of snout, lips and branchiostegal membranes black.

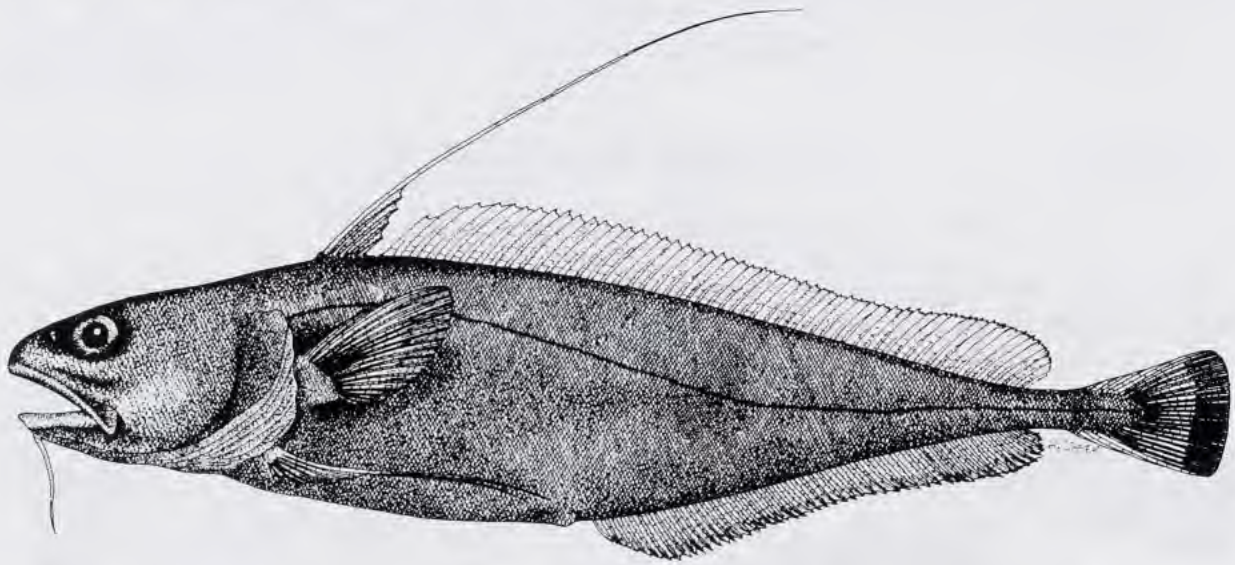

FIG. 6. — *Lepidion inosimae* (Günther, 1887), specimen of 605 mm SL (MNHN 1995-1012), seamount "K", southeast of New Caledonia, 805 m depth, F.V. "HUMBOLDT", 1991, stn 21-2.

DISTRIBUTION. — *Lepidion inosimae* has an anti-equatorial distribution in the west Pacific Ocean. It has been recorded from the northwest Pacific in Sagami Bay, Japan, at the Ramapo Bank south of Japan, and on the Emperor Seamounts (NAKAYA *et al.*, 1980). In the southwest Pacific it is known in southeast Australian waters (PAXTON & HANLEY, 1989), New Zealand waters north of the Chatham Rise (PAULIN, 1984; 1990) and off New Caledonia (the present study).

REMARKS. — With the exception of *L. schmidti*, the very small scales distinguish this species from other species of the genus in the Indo-Pacific region. *Lepidion inosimae* can be distinguished from *L. schmidti* by a rounded (vs triangular) patch of villiform teeth on the vomer. This is the first record of the species from New Caledonia. *Lepidion inosimae* can exceed 2 m in length and is the largest species in the family (PAULIN, 1989a).

Genus ***MORA*** Risso, 1826

Mora Risso, 1826: 224 (feminine, type species *Mora mediterranea* Risso by monotypy).

DIAGNOSIS. — Morid fishes with blunt otoliths with a cup shaped expansion of the crista inferior and a greatly expanded anterior end; anal fin greatly depressed along the middle of its length and often divided into two fins (PAULIN, 1983).

REMARKS. — A monotypic genus with a single widespread species recognized.

Source : MNHN, Paris

Mora moro (Risso, 1810)

Fig. 7

Gadus moro Risso, 1810: 116 (original description, Mediterranean Sea).
Mora pacifica Waite, 1914: 128 (original description, Kaikoura, New Zealand).
Mora dannevigi Whitley, 1948: 82 (original description, Great Australian Bight).
Mora moro: PAULIN, 1983: 112 (synonymy, description, fig.). — PAXTON & HANLEY, 1989: 301 (synonymy).

MATERIAL EXAMINED. — 2 specimens, 370-520 mm SL.

Norfolk Ridge. BERYX 3: stn 9, 24°43.3'S, 170°07.5'E (seamount "K", southeast of New Caledonia), 719-753 m depth, bottom longline, R. V. *"Alis"*, 5 December 1991: 1 specimen, 370 mm SL (MNHN 1995-1014).

BERYX 5: stn 1, 24°54.3'S, 168°21.1'E (seamount "B", southeast of New Caledonia), 597-625 m depth, bottom longline, R. V. *"Alis"*, 29 January 1992: 1 specimen, 520 mm SL (MNHN 1995-1015)*.

DIAGNOSIS. — As for genus.

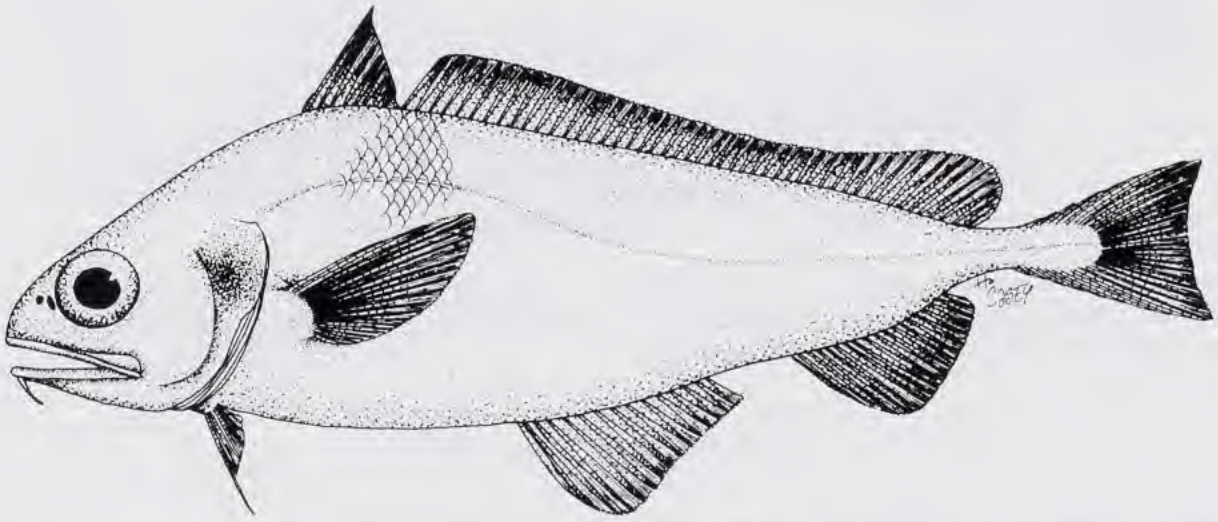

FIG. 7. — *Mora moro* (Risso, 1810), specimen of 520 mm SL (MNHN 1995-1015), seamount "B", southeast of New Caledonia, 597-625 m depth, BERYX 5, stn 1.

DESCRIPTION. — Body elongate, rounded, slightly compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, shorter than diameter of eye. A small barbel present on chin. Teeth villiform, a rounded patch on vomer. First dorsal fin origin behind pectoral insertion, first ray minute, second longest, less than length of head. Second dorsal commences immediately behind first, height more or less uniform throughout its length. Anal fin commences immediately behind anus, height depressed along middle of its length and often divided into two separate fins. Caudal fin truncated. Pelvic fins not reaching anus.

Measurements (in mm, % SL in parenthesis). Standard length 370.0-520.0; head length 92.5-131.5 (25.0-25.2), width 60.0-86.9 (16.2-16.7); body depth 101.0-145.0 (27.2-27.8); caudal peduncle depth 11.1-24.0 (3.0-4.6); orbit diameter 37.5-44.6 (10.1-8.5); interorbital width 17.9-27.5 (4.8-5.2); snout length 21.3-31.8 (5.7-6.1); maxilla length 46.7-67.0 (12.6-13.4); length of pectoral fin 68.5-94.4 (18.5-18.1); length of pelvic fin 58.2-49.0 (15.7-9.4); length of longest ray of first dorsal 45.1-59.3 (12.1-11.4), second 32.1-43.1 (8.6-8.2); length of longest ray of first anal fin 43.0-55.5 (11.6-10.6), second 41.2-43.7 (11.1-8.4); predorsal length 114.6-180.0 (30.9-34.6); preanal length 188.0-256.0 (50.8-49.2).

Source : MNHN, Paris

Meristics. First dorsal fin rays 1 + 8; second dorsal fin rays 49-51; first anal fin rays 15-16; second anal fin rays 19; caudal fin with 8-9 dorsal procurrent rays, 19-20 branched rays, and 10-12 ventral procurrent rays; pectoral fin rays 21; scale rows in transverse series 6-7 + (1) + 18-17; vertebrae 51.

Coloration (from preserved specimens). Head and body pale grey with darker flecks on edges of scale pockets. Fins with pale brown membranes. Buccal cavity pale, branchial cavity black.

DISTRIBUTION. — *Mora moro* is widely distributed in temperate and subtropical waters outside the South Atlantic and North Pacific Oceans; it is known from the Mediterranean Sea, Northwest Atlantic Ocean, Southern Indian Ocean south of Madagascar, the South Pacific Ocean off Australia, New Caledonia, New Zealand and off Chile (PAULIN, 1983; PAXTON & HANLEY, 1989; COHEN *et al.*, 1990; this study).

REMARKS. — *Mora moro* has previously been recorded in the South Pacific Ocean as *M. pacifica* Waite (New Zealand and Chile) and *M. dannevigi* Whitley (Australia), but these have been shown to be synonyms of *Mora moro* by PAULIN (1983). This is the first record of the species from New Caledonia, and is the most northern locality known in the Southern Hemisphere.

Genus ***PHYSICULUS*** Kaup, 1858

Physiculus Kaup, 1858: 88 (masculine, type species *Physiculus dalwigki* Kaup by monotypy).

DIAGNOSIS. — Morid fishes with pointed, spindle shaped otoliths (Fig. 1D); anus in advance of anal fin origin; a ventral light organ placed between pelvic fin insertions and anus.

REMARKS. — The most speciose morid genus with over 31 species recognized; found in tropical and warm temperate waters of all oceans, many species confined to seamounts, submarine ridges or island chains in the Pacific region (PAULIN, 1989b; COHEN *et al.*, 1990: 351).

Physiculus longifilis Weber, 1913

Fig. 8

Physiculus longifilis Weber, 1913: 58 (original description, Flores Sea, Indonesia).

MATERIAL EXAMINED. — 1 specimen, 76.1 mm SL.

New Caledonia. BATHUS 1: stn 711, 21°43.00'S, 166°35.71'E (off central east New Caledonia), 320 m depth, R. V. *"Alis"*, 19 March 1993: 1 specimen, 76.1 mm SL (MNHN 1995-1016)*.

DIAGNOSIS. — A species of *Physiculus* with a moderately small light organ placed slightly closer to anus than level of pelvic fin insertion, distance between rear margin of light organ and anus slightly more than diameter of light organ (Fig. 8B); ventral fins long, reaching to mid point of anal fin (PAULIN, 1989b).

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Barbel present on chin. Teeth villiform, equal sized, vomer without teeth. First dorsal fin origin behind pectoral insertion, first ray minute, third or fourth ray longest but only slightly longer than other rays. Second dorsal commences immediately behind first, height less than that of first dorsal and more or less uniform throughout its length. Anal fin commences a short distance behind anus, height only slightly depressed along middle of its length. Caudal fin truncated to slightly rounded. Pelvics reaching to midpoint of anal fin. Ventral light organ moderately small, in advance of anus and placed closer to anus than level of pelvic fin insertions.

Source : MNHN, Paris

Measurements (in mm, % SL in parenthesis). Standard length 76.1; head length 21.5 (28.2), width 12.1 (15.9); body depth 14.5 (19.0); caudal peduncle depth 2.2 (2.8); orbit diameter 3.8 (4.9); interorbital width 5.5 (7.2); snout length 5.6 (7.3); maxilla length 10.0 (13.1); length of pectoral fin 12.0 (15.7); length of pelvic fin 40.1 (52.6); length of longest ray of first dorsal 7.2 (9.4), second 4.5 (5.9); predorsal length 21.5 (27.8); preanal length 27.6 (36.2); diameter of light organ 0.9 (0.06); distance from light organ to interpelvic line 9.5 (6.3).

Meristics. First dorsal fin rays 1 + 6; second dorsal fin rays 59; anal fin rays 63; pectoral fin rays 24; pelvic fin rays 6; oblique scale rows in longitudinal series ca. 75; scales between origin of first dorsal fin and lateral line 6; gill rakers 3 + 9; vertebrae 51.

Coloration (from preserved specimen). Head and body pale pinkish tan, abdomen bluish. Branchiostegal membranes, snout, orbit rim and remaining scale pockets brown. Vertical fins dusky near tips, axil of pectoral fin dark brown. Light organ and anus black.

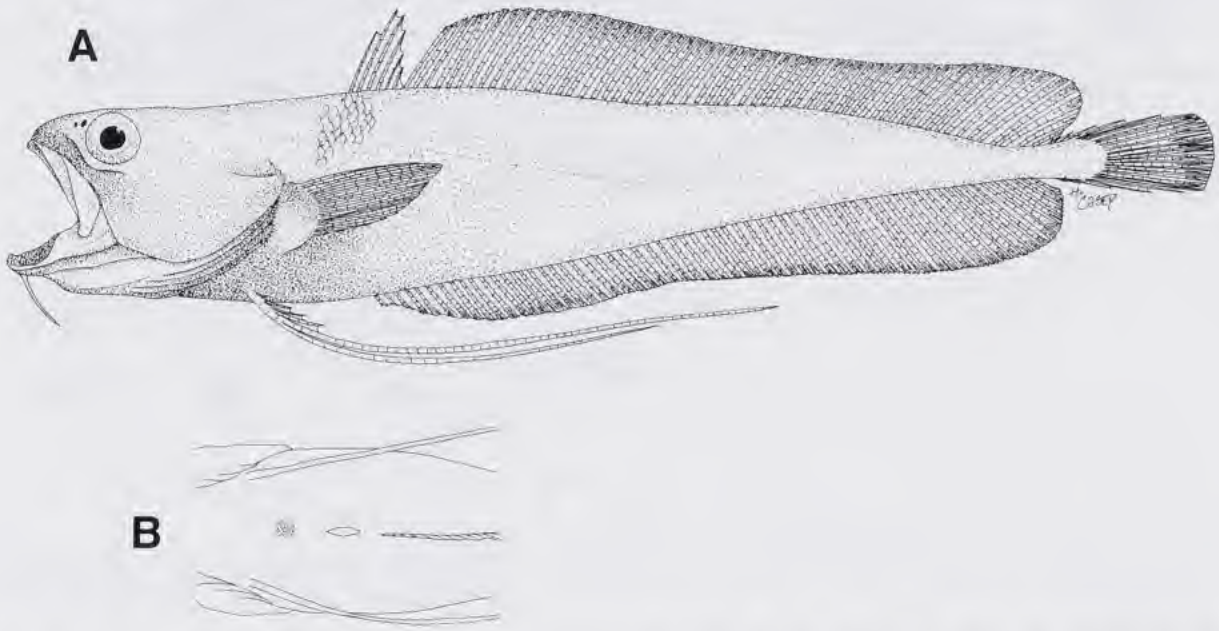

FIG. 8. — *Physiculus longifilis* Weber, 1913, specimen of 76.1 mm SL (MNHN 1995-1016), off central east coast, New Caledonia, 320 m depth, BATHUS, stn 711. — **A**: whole fish in left lateral view. — **B**: ventral view of light organ.

DISTRIBUTION. — *Physiculus longifilis* is known from Indonesia and northern Australia at 250 m depth (PAULIN, 1989b); it is now also known from off New Caledonia (this study).

REMARKS. — This study extends the known range of *P. longifilis* in the western Pacific Ocean into New Caledonian waters; it is expected that the species will occur on other slope areas and possibly seamounts in the area.

Physiculus luminosus Paulin, 1983

Fig. 9

Physiculus luminosa Paulin, 1983: 96, fig. 11 (original description, between Alderman & Red Mercury Islands, New Zealand).

Physiculus luminosa: PAULIN, 1989b: 115, fig. 14 (description, distribution). — PAXTON & HANLEY, 1989: 301 (synonymy, distribution).

Source : MNHN, Paris

MATERIAL EXAMINED. — 1 specimen, 176 mm SL.

New Caledonia. 20°50.0'S, 165°15.0'E (Grande Passe Touho, east coast of Grande Terre), 400-440 m depth, F. V. "*Dar Mad*", 17 March 1986: 1 specimen, 176 mm SL (MNHN 1995-1017)*.

DIAGNOSIS. — A species of *Physiculus* with a large light organ placed adjacent to the level of pelvic fin insertion, distance between rear margin of light organ and anus approximately equal to twice diameter of light organ (Fig. 9B); 11-16 scales between origin of first dorsal fin and lateral line (PAULIN, 1989b).

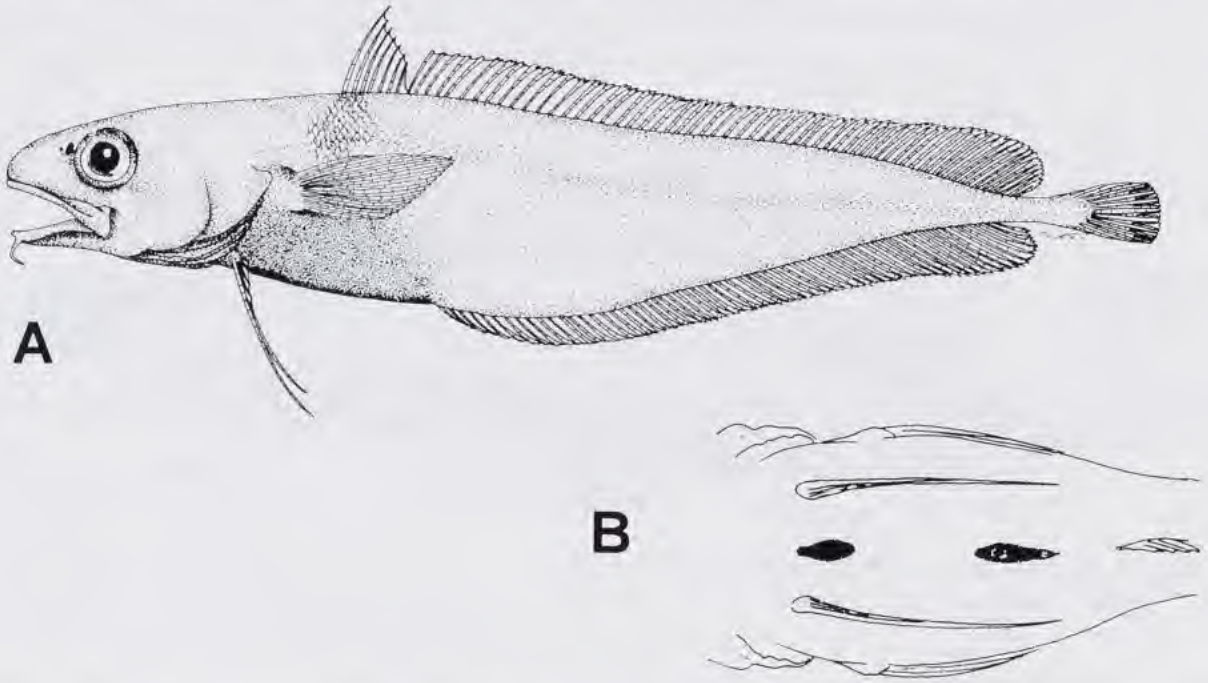

FIG. 9. — *Physiculus luminosus* Paulin, 1983, specimen of 176 mm SL (MNHN 1995-1017), Grande Passe Touho, New Caledonia, 400-440 m depth, F. V. "*Dar Mad*", 1986. — **A**: whole fish in left lateral view. — **B**: ventral view of light organ.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Barbel present on chin. Teeth villiform, equal sized, vomer without teeth. First dorsal fin origin behind pectoral insertion, first ray minute, third or fourth ray longest but only slightly longer than other rays. Second dorsal commences immediately behind first, height less than that of first dorsal and more or less uniform throughout its length. Anal fin commences a short distance behind anus, height only slightly depressed along middle of its length. Caudal fin truncated to slightly rounded. Pelvics reaching to midway between anus and anal fin. Ventral light organ large, well in advance of anus and placed close to level of pelvic fin insertions.

Measurements (in mm, % SL in parenthesis). Standard length 176.0; head length 46.9 (26.6), width 34.0 (19.3); body depth 31.8 (18.0); caudal peduncle depth 4.4 (2.5); orbit diameter 10.6 (6.0); interorbital width 10.4 (5.9); snout length 13.5 (7.6); maxilla length 22.9 (13.0); length of pectoral fin 29.1 (16.5); length of pelvic fin 25.2 (14.3); length of longest ray of first dorsal 21.4 (12.1), second 16.6 (9.4); length of longest ray of anal fin 14.7 (8.3); predorsal length 54.1 (30.7); preanal length 72.0 (40.9); diameter of light organ 5.6 (3.1); distance from light organ to interpelvic line 1.1 (0.6).

Meristics. First dorsal fin rays 1 + 7; second dorsal fin rays 64; anal fin rays 68; pectoral fin rays 25; pelvic fin rays 6; oblique scale rows in longitudinal series ca. 115; scales between origin of first dorsal fin and lateral line 12; gill rakers 4 + 10; vertebrae 54.

Source : MNHN, Paris

Coloration (from preserved specimen). Head and body pale pinkish tan, abdomen bluish. Branchiostegal membranes, snout, orbit rim and remaining scale pockets brown. Vertical fins dusky near tips, axil of pectoral fin dark brown. Light organ and anus black.

DISTRIBUTION. — *Physiculus luminosus* is known from the South Pacific Ocean, and has been recorded off South America on the Nasca Ridge, in the central South Pacific on the Austral Ridge, and in the Southwest Pacific off northern New Zealand and eastern Australia (Queensland and New South Wales) at 130-640 m depth (PAULIN, 1989b; PAXTON & HANLEY, 1989); it is now also known from off New Caledonia (this study).

REMARKS. — This study extends the known range of *P. luminosus* in the western Pacific Ocean into New Caledonian waters. *Physiculus luminosus* inhabits shelf and slope areas off Australia and New Zealand, within the New Caledonian EEZ it has only been collected on the slope of the main island of New Caledonia. Further survey work is required to help establish whether the species is confined to the main island slope or extends on to offshore seamounts where its congener, *P. therosideros*, is particularly common (see below).

Physiculus roseus Alcock, 1891

Fig. 10

Physiculus roseus Alcock, 1891: 18 (original description, Andaman sea).
Physiculus roseus: PAULIN, 1989b: 123 (description, distribution). — PAXTON & HANLEY, 1989: 302 (synonomy, distribution).

MATERIAL EXAMINED. — 2 specimens, 83.8-85.0 mm SL.
New Caledonia. BATHUS 1: stn 657, 21°14.45'S, 165°54.93'E (off central west coast of Grande Terre), 510 m depth, beam trawl, R. V. *"Alis"*, 12 March 1993: 2 specimens, 83.8-85.0 mm SL (MNHN 1995-1018)*.

DIAGNOSIS. — A species of *Physiculus* with a moderately large light organ placed slightly closer to the level of pelvic fin insertion than anus, distance between rear margin of light organ and anus slightly more than one and a half times diameter of light organ (Fig. 10B); 90-95 scale rows in longitudinal series; 8 scales between origin of first dorsal fin and lateral line; 46-49 vertebrae (PAULIN, 1989b).

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, about equal to diameter of eye. Barbel present on chin. Teeth villiform, equal sized, vomer without teeth. First dorsal fin origin behind pectoral insertion, first ray minute, third or fourth ray longest but only slightly longer than other rays. Second dorsal commences immediately behind first, height less than that of first dorsal and more or less uniform throughout its length. Anal fin commences a short distance behind anus, height only slightly depressed along middle of its length. Caudal fin truncated to slightly rounded. Pelvics reaching to about sixth ray of anal fin. Ventral light organ large, and placed slightly closer to level of pelvic fin insertions than anus.

Measurements (in mm, % SL in parenthesis). Standard length 83.8-85.0; head length 22.6-22.8 (26.5-27.2), width 11.3 (13.4); body depth 11.0-13.3 (12.9-15.8); caudal peduncle depth 1.6-1.9 (1.9-2.2); orbit diameter 5.2-5.6 (6.2-6.5); interorbital width 4.5-4.6 (5.3-5.4); snout length 5.5-6.1 (6.5-7.1); maxilla length 9.7-10.6 (11.4-12.6); length of pectoral fin 12.0-14.4 (14.3-16.9); length of pelvic fin 10.8-13.5 (12.1-12.7); length of longest ray of first dorsal 10.2-10.8 (12.1-12.7), second 7.1-7.5 (8.4-8.8); predorsal length 24.0-24.2 (28.4-28.6); preanal length 30.0-30.6 (35.7-36.0); diameter of light organ 1.2-1.4 (1.4-1.6); distance from light organ to interpelvic line 10.6-11.6 (11.6-12.6).

Meristics. First dorsal fin rays 1 + 8-9; second dorsal fin rays 59-65; anal fin rays 66-67; pectoral fin rays 24-25; pelvic fin rays 6; oblique scale rows in longitudinal series ca. 90-93; scales between origin of first dorsal fin and lateral line 8; gill rakers 3 + 10-11; vertebrae 47-48.

Source : MNHN, Paris

Coloration (from preserved specimen). Head and body pale pinkish tan, abdomen bluish. Branchiostegal membranes, snout, orbit rim and remaining scale pockets brown. Vertical fins dusky near tips, axil of pectoral fin dark brown. Light organ and anus black.

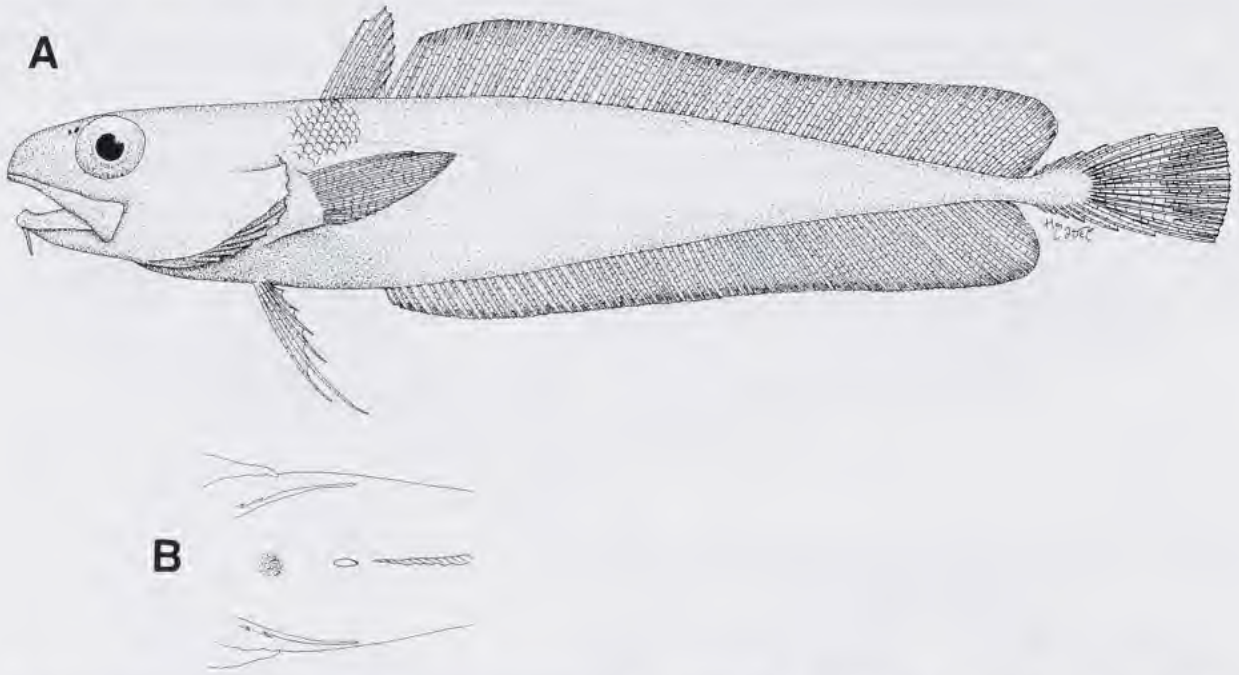

FIG. 10. — *Physiculus roseus* Alcock, 1891, specimen of 83.8 mm SL (MNHN 1995-1018), off central east coast, New Caledonia, 510 m depth, BATHUS 1, stn 657. — **A**: whole fish in left lateral view. — **B**: ventral view of light organ.

DISTRIBUTION. — *Physiculus roseus* is known from throughout the Indo-Pacific region, from the Bay of Bengal in the eastern Indian Ocean to western Australia, Indonesia, Papua New Guinea and the south China Sea, at 300-510 m depth (PAULIN, 1989b; PAXTON & HANLEY, 1989); it is now also known from off New Caledonia (this study).

REMARKS. — This study extends the known range of *P. roseus* into New Caledonian waters; it is the most easterly record for the species and the first record for New Caledonia.

Physiculus therosideros Paulin, 1987

Fig. 11, Table 2

Physiculus therosideros Paulin, 1987: 76 (original description, New South Wales, Australia).

Physiculus therosideros:PAULIN, 1989b: 126, figs 13-14 (description, distribution).

MATERIAL EXAMINED. — 112 specimens, 100.5-168.0 mm SL.

New Caledonia. BIOCAL: stn CP 67, 24°55.44'S, 168°21.55'E (seamount "B"), 500 m depth, beam trawl, R. V. "*Jean Charcot*", 3 September 1985: 11 specimens (MNHN 1995-1019)*. — Stn CP 108, 22°02.55'S, 167°05.68'E (off Yate, Grande Terre), 335 m depth, beam trawl, 9 September 1985: 1 specimen (MNHN 1995-1020)*.

MUSORSTOM 4: stn CP 213, 22°51.30'S, 167°12.00'E (southern slope of Grande Terre), 405-430 m depth, beam trawl, R. V. "*Vauban*", 28 September 1985: 2 specimens (MNHN 1995-1021)*. — Stn CP 214, 22°53.80'S, 167°13.90'E (southern slope of Grande Terre), 425-440 m depth, beam trawl, 28 September 1985: 1 specimen (MNHN 1995-1022)*. — Stn CP 215,

Source : MNHN, Paris

22°55.70'S, 167°17.00'E (southern slope of Grande Terre), 485-520 m depth, beam trawl, 28 September 1985: 5 specimens (MNHN 1995-1023)*. — stn CP 216, 22°59.50'S, 167°22.00'E (southern slope of Grande Terre), 490-510 m depth, beam trawl, 29 September 1985: 5 specimens (MNHN 1995-1024)*.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 312, 22°17.20'S, 159°24.80'E (off Bellona Reefs, Bellona Plateau), 315-320 m depth, beam trawl, R. V. *"Coriolis"*, 12 October 1986: 1 specimen (MNHN 1995-1025)*.

Norfolk Ridge. CHALCAL 2: stn CC 2, 24°55.48'S, 168°21.29'E (seamount "B"), 500-610 m depth, otter trawl, R. V. *"Coriolis"*, 28 October 1986: 14 specimens (MNHN 1995-1026)*. — Stn CP 25, 23°38.60'S, 167°43.12'E (Stylaster seamount), 418 m depth, 30 October 1986: 6 specimens (MNHN 1995-1027)*.

SMIB 3: stn CP 4, 24°54.00'S, 168°21.50'E (seamount "B"), 530 m depth, beam trawl, R. V. *"Vauban"*, 20 May 1987: 9 specimens (MNHN 1995-1028).

SMIB 4: stn DW 34, 24°55.00'S, 168°22.00'E (seamount "B"), 515 m depth, Waren dredge, R. V. *"Alis"*, 7 March 1989: 2 specimens (MNHN 1995-1029)*. — Stn DW 36, 24°55.6'S, 168°27.7'E (seamount "B"), 530 m depth, Waren dredge, 7 March 1989: 1 specimen (MNHN 1995-1030)*. — Stn DW 58, 22°59.8'S, 167°24.2'E (Ile des Pins slope), 560 m depth, Waren dredge, 9 March 1989: 1 specimen (MNHN 1995-1031)*.

AZTEQUE: stn 1, 23°13.3'S, 168°04.6'E (Aztèque seamount), 290-460 m depth, otter trawl, R. V. *"Alis"*, 12 February 1990: 6 specimens (MNHN 1995-1032). — Stn 4, 23°42.5'S, 168°01.2'E (Jumeaux seamount), 235-400 m depth, otter trawl, 13 February 1990: 4 specimens (MNHN 1995-1033). — Stn 7, 23°41.0'S, 167° 45.8'E (Stylaster seamount), 425-500 m depth, otter trawl, 14 February 1990: 11 specimens (MNHN 1995-1034). — Stn 11, 22°54.8'S, 167°35.7'E (Ile des Pins shelf), 340-360 m depth, otter trawl, 15 February 1990: 2 specimens (MNHN 1995-1035).

BERYX 2: stn 4, 24°56.6'S, 168°21.8'E (seamount "B"), 580-590 m depth, otter trawl, R. V. *"Alis"*, 24 October 1991: 1 specimen (NMNZ-P.27444)*. — Stn 5, 24°56.6'S, 168°21.1'E (seamount "B"), 522-575 m depth, bottom trawl, 24 October 1991: 2 specimens (NMNZ-P.27453)*, and 3 specimens (NMNZ-P.27454)*.

BERYX 11: stn CP 8, 24°52.50'S, 168° 21.60'E (Seamount "B"), 540-570 m depth, beam trawl, R. V. *"Alis"*, 15 October 1992: 24 specimens (NMNZ-P.29056)*.

DIAGNOSIS. — A species of *Physiculus* with a large ventral light organ placed well behind the pelvic fin insertions, distance between rear margin of light organ and anus approximately equal to diameter of light organ (Fig. 11B); 8-11 scales between origin of first dorsal fin and lateral line.

DESCRIPTION. — Body elongate, compressed posteriorly, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Barbel present on chin. Teeth villiform, those in the outer series slightly larger, none on vomer. First dorsal fin origin behind pectoral insertion, first ray minute, third or fourth ray longest, but not greatly exceeding length of other rays. Second dorsal commences immediately behind first, height more or less equal to first and uniform throughout its length. Anal fin commences a short distance behind anus, height only slightly depressed along middle of its length. Caudal fin truncated. Pelvics reaching well beyond anus to about third anal fin ray. Ventral light organ large, placed a short distance behind level of pelvic fin insertions.

Measurements (in mm, % SL in parenthesis). Standard length 100.5-168.0; head length 27.3-42.5 (23.9-27.1), width 17.0-27.7 (13.2-17.9); body depth 16.5-28.0 (16.4-18.0); caudal peduncle depth 2.5-4.1 (1.8-2.6); orbit diameter 7.4-9.4 (5.9-7.3); interorbital width 5.8-10.1 (4.6-6.4); snout length 7.6-12.3 (7.1-7.8); maxilla length 13.2-20.9 (10.5-13.3); length of pectoral fin 14.8-23.2 (13.7-14.7); length of pelvic fin 17.3-25.2 (15.1-17.2); length of longest ray of first dorsal 6.9-11.6 (6.8-7.5), second dorsal 6.7-11.1 (6.6-7.5); length of longest ray of anal fin 6.5-11.0 (6.4-7.0); predorsal length 32.0-48.0 (25.9-31.8); preanal length 38.5-58.5 (37.3-38.3); diameter of light organ 2.1-3.2 (2.0-2.2); distance from light organ to interpelvic line 2.5-4.0 (2.3-2.5).

Meristics. Frequency distributions of counts of dorsal fin rays, anal fin rays and vertebrae are given in Table 2. First dorsal fin rays 1 + 5-7; second dorsal fin rays 63-73; anal fin rays 66-74; pectoral fin rays 22-25; pelvic fin rays 5-6; oblique scale rows in longitudinal series ca. 125-128; scales between origin of first dorsal fin and lateral line 8-11; gill rakers 2-3 + 7-8; vertebrae 53-56.

Coloration (from fresh and frozen specimens). Head pinkish, top of head and snout brown; body pinkish, silvery on sides and pectoral base, scale pockets brown dorsally, abdomen pale grey-blue; light organ black; dorsal, anal and caudal fins pinkish red, with fine black margins; pectoral fin bright reddish pink, its base dark brownish black; ventral fins pink, with a black insertion; light organ black.

Source : MNHN, Paris

(Museum of New Zealand) for her careful artwork in preparing the illustrations and Trevor WILLIS (Museum of New Zealand) for radiography. Funding for visits by the authors to ORSTOM, Nouméa, was provided by the Ministry of Foreign Affairs, Paris, assisted by the French Embassy, Wellington, and ORSTOM Centre de Nouméa. Support for this cooperative programme is gratefully acknowledged. René GRANDPERRIN, Jacques RIVATON, and Michel KULBICKI kindly gave us much friendly assistance during our visits to New Caledonia. We also thank captain Michel LE BOULCH, second captain Hervé LE HOUARNO, the officers and crew of ORSTOM R. V. *"Alis"* for their skilled help in collecting fishes during exploratory fishing off New Caledonia. The manuscript benefited from comments provided by Jacques RIVATON (who also provided the French "Résumé"), Michel KULBICKI and Bernard SÉRET.

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Source : MNHN, Paris

TABLE 2. — Frequency distributions of counts of selected fin rays and vertebrae of *Physiculus therosideros* Paulin, 1987, from New Caledonia (total n = 52-56).

	First					Second												
Dorsal fin	6	7	8			61	62	63	64	65	66	67	68	69	70	71	72	73
	9	39	8			1	0	1	4	9	7	9	6	7	1	5	3	1
Anal fin	63	64	65	66	67	68	69	70	71	72	73	74						
	1	1	0	1	3	4	12	9	6	3	6	7						
Vertebrae	52	53	54	55	56													
	6	12	16	16	2													

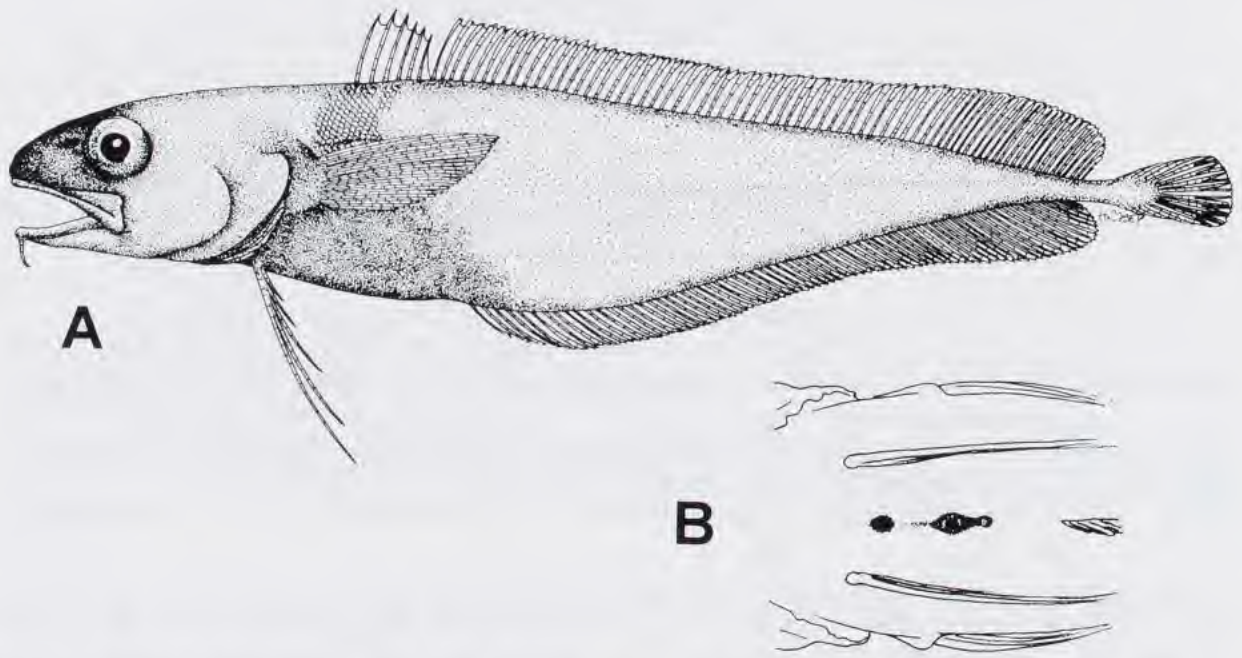

FIG. 11. — *Physiculus therosideros* Paulin, 1987, specimen of 152 mm SL (NMNZ-P.27453), seamount "B", southeast of New Caledonia, 580-590 m depth, BERYX 2, stn 4. — **A**: whole fish in left lateral view. — **B**: ventral view of light organ.

Coloration (from preserved specimens). Head and body pale tan, abdomen bluish. Branchiostegal membranes, snout, orbit rim and remaining scale pockets brown. Vertical fins with a black margin, insertion of pectoral fin dark brown. Light organ and anus black.

DISTRIBUTION. — *Physiculus therosideros* occurs in deep subtropical waters of the southwest Pacific Ocean. It is known from off Queensland and New South Wales (Australia), Bellona Plateau, on Norfolk Ridge seamounts and the Ile des Pins region southeast of New Caledonia, and off the Kermadec Islands north of New Zealand, at 83-610 m depth (PAULIN, 1987; 1989b; this study).

Source : MNHN, Paris

REMARKS. — *Physiculus therosideros* was previously known only from eight specimens collected off Australia and the Kermadec Islands, and one specimen from New Caledonia (PAULIN, 1989b). The number of preserved specimens examined in this study (n = 112) and the large numbers of fresh specimens observed in catches during the BERYX 11 stations (specimens present in 17 out of 60 stations, with beam trawls containing up to 35 specimens, pers. obs.) indicate that this species is particularly common on seamounts south of New Caledonia. The number of specimens examined enable a greater range of meristic variation to be described than previously recorded, particularly in second dorsal and anal fin ray counts (Table 1): D_2 61-73, A 63-74 (cf. D_2 60-63, A 62-66 given by PAULIN, 1987; 1989b). The ranges of fin ray counts are now known to be similar to those of *P. luminosus* (D_2 62-71, A 64-79), however, the species can be distinguished by the position of the light organ and number of transverse scale rows.

RIVATON *et al.* (1989: 53) and GRANDPERRIN *et al.* (1990: 18) recorded *Physiculus peregrinus* (Günther) from New Caledonia, a species only known from the Philippines area (PAULIN, 1989b). Examination of voucher specimens collected during cruise AZTEQUE shows that this record is based on misidentifications of *P. therosideros*. *P. therosideros* can be readily distinguished from *P. peregrinus* by counts of scales between base of first dorsal fin and lateral line (11-14, vs 7-8) and gill rakers (2-3 + 7-8, vs 4 + 10-12).

Genus ***TRIPTEROPHYCIS*** Boulenger, 1902

Tripterophycis Boulenger, 1902: 335 (feminine, type species *Tripterophycis gilchristi* Boulenger by monotypy).

DIAGNOSIS. — Morid fishes with pointed, spindle shaped otoliths (Fig. 1E); chin barbel present; three dorsal fins (second dorsal divided into a high anterior portion and a low posterior portion); long-based anal fin; ventral light organ present.

REMARKS. — A genus of benthopelagic morids containing two species, widespread in temperate and subtropical waters of the Southern Hemisphere (COHEN *et al.*, 1989: 378; SAZONOV & PAKHORUKOV, 1992).

Tripterophycis svetovidovi Sazonov & Shcherbachev, 1986

Fig. 12

Tripterophycis svetovidovi Sazonov & Shcherbachev, 1986: 1099, fig. 1 (original description, Sala y Gomez Ridge, southeast Pacific Ocean).

Tripterophycis sp.: RIVATON *et al.*, 1989: 53 (listed).

MATERIAL EXAMINED. — 8 specimens, 167.5-234.0 mm SL.

Norfolk Ridge. CHALCAL 2: stn CC 1, 24°54.96'S, 168°21.91'E (seamount "B"), 500-580 m depth, otter trawl, R. V. *"Coriolis"*, 28 October 1986: 1 specimen, 196 mm SL (MNHN 1995-1036)*. — Stn CC 2, 24°25.48'S, 168°21.25'E (seamount "B"), 500-610 m depth, otter trawl, 28 October 1986: 1 specimen, 195 mm SL (MNHN 1995-1037)*.

SMIB 3: stn CP 4, 24°54.0'S, 168° 21.5'E (seamount "B"), 530 m depth, beam trawl, R. V. *"Vauban"*, 20 May 1987: 1 specimen, 195 mm SL (MNHN 1995-1038). — Exact locality unknown (south of New Caledonia), beam trawl, May 1987: 1 specimen, 197 mm SL (MNHN 1995-1039).

BERYX 2: stn 4, 24°56.6'S, 168°21.8'E (seamount "B"), 580-583 m depth, otter trawl, R. V. *"Alis"*, 24 October 1990: 2 specimens, 220-234 mm SL (NMNZ-P.27443)*.

New Caledonia. BIOCAL: stn CP 67, 24°55.44'S, 168°21.55'E (seamount "B"), 500 m depth, beam trawl, R. V *"Jean Charcot"*, 3 September 1985: 1 specimen, 167 mm SL (MNHN 1995-1040)*.

DIAGNOSIS. — A species of *Tripterophycis* with conical teeth in lower jaw; 14-15 scales between origin of second dorsal fin and lateral line; 217-225 oblique scale rows in longitudinal series; snout length 25.2-32.0% head length.

Source : MNHN, Paris

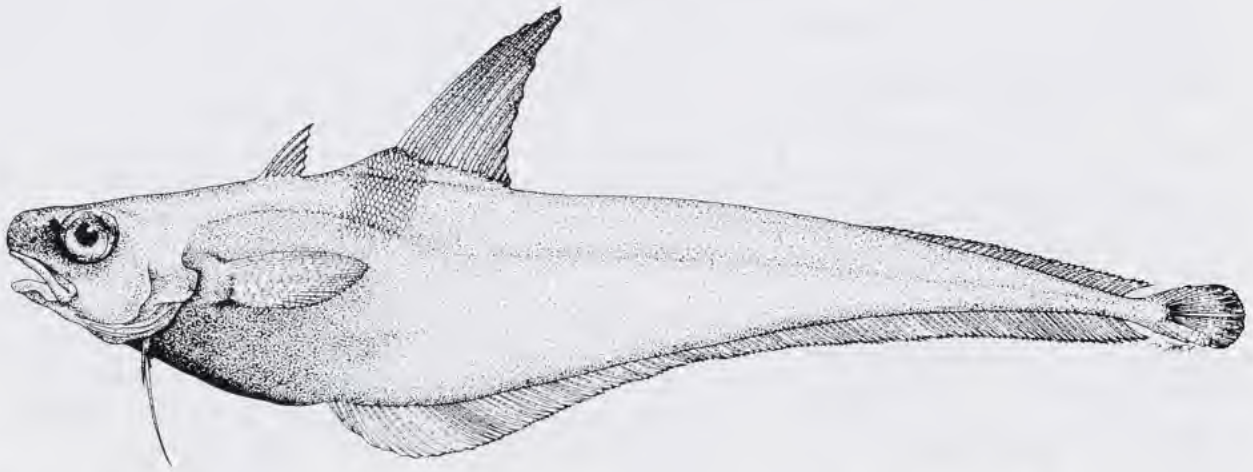

FIG. 12. — *Tripterophycis svetovidovi* Sazonov & Shcherbachev, 1986, specimen of 216 mm SL (NMNZ-P.27443), seamount "B", southeast of New Caledonia, 220-234 m depth, BERYX 2, stn 4.

DESCRIPTION. — Body elongate, compressed, greatest depth at origin of second dorsal fin. Snout broad, rounded, slightly shorter than diameter of eye. Interorbital width less than diameter of eye. Minute barbel present on chin. Teeth small, conical, in a single irregular series. First dorsal fin origin above pectoral insertion, first ray minute, second longest. Second dorsal commences a short distance behind first, and divided into two portions: a high anterior portion and a long low posterior portion. Anal fin commences a short distance behind anus, height not depressed along middle of its length. Caudal fin rounded. Pelvics reaching anus.

Measurements (in mm, % SL in parenthesis). Standard length 167.5-234.0; head length 27.6 36.5 (15.5-16.4), width 18.1-23.6 (9.8-10.8); body depth 28.4-45.1 (16.9-19.2); caudal peduncle depth 3.5-5.6 (2.0-2.4); orbit diameter 8.5-12.5 (5.0-5.3); interorbital width 7.2-10.6 (4.1-4.5); snout length 7.8-9.2 (3.9-4.6); maxilla length 12.5-15.4 (6.6-7.4); length of pectoral fin 21.1-27.2 (11.6-12.5); length of pelvic fin 16.1-19.2 (7.8-9.6); length of longest ray of first dorsal fin 10.2-13.8 (5.7-6.3), second dorsal fin 30.0-42.1 (17.6-19.4), third dorsal fin 5.0-8.6 (2.9-3.9); length of longest ray of anal fin 15.1-21.0 (8.4-9.0); predorsal length 35.5-44.3 (17.0-21.1); preanal length 45.2-59.6 (23.1-26.9).

Meristics. First dorsal fin rays 1 + 4-5; second dorsal fin rays 15-17; third dorsal fin rays 35-41; anal fin rays 103-105; pectoral fin rays 21-23; pelvic fin rays 5; oblique scale rows in longitudinal series 217-225; scales between origin of second dorsal fin and lateral line 14-15; gill rakers 3 + 11-12; vertebrae 69-71.

Coloration (from fresh and frozen specimens). Head silvery on sides, top and snout dark brown; body brownish grey; scale pockets on head and body brown; abdomen blue grey ventrally, becoming silvery laterally; first dorsal fin blue grey; second dorsal fin brown basally, blue grey in middle, black distally; third dorsal and anal fins blue grey, distal tips of rays black; caudal and pectoral fins black.

Coloration (from preserved specimens). Head and body pale tan with darker brown on snout and orbit, abdomen bluish with silvery sheen, fins dark blue-brown to black.

DISTRIBUTION. — *Tripterophycis svetovidovi* has been recorded from the Kit Range and Rui-Grande Peak in the South Atlantic Ocean, from the Madagascar Ridge in the Southern Indian Ocean and in the South Pacific Ocean off Australia and the Sala y Gomez Ridge off South America at 385-950 m depth (PARIN, 1985; SAZONOV & SHCHERBACHEV, 1986; COHEN *et al.*, 1990; PARIN, 1991; SAZONOV & PAKHORUKOV, 1992). This is the first record for New Caledonia, where to date it appears to be confined to seamount "B" (also known as "Banc Éponge").

Source : MNHN, Paris

REMARKS. — *Tripterophycis svetovidovi* differs from its congener *T. gilchristi* Boulenger in having small, irregular, conical teeth in the jaws (vs close set, chisel-shaped or incisorform teeth); scales between origin of second dorsal fin and lateral line 14-15 (vs 11-12); and larger snout, its length 25.2-32.0% head length (vs 21.0-25.0% head length) (SAZONOV & SHCHERBACHEV, 1986; SAZONOV & PAKHORUKOV, 1992).

KEY TO MORID CODS RECORDED FROM NEW CALEDONIAN WATERS

(Note: Moridae distinguished from Euclichthyidae by having symmetrical anal and caudal fins)

1 Three dorsal fins present ..... ***Tripterophycis svetovidovi***
1' Two dorsal fins present **2**

2 Ventral light organ present; dermal window visible as round black area on belly (may be minute); abdomen deep bluish black in colour **3**
2' No ventral light organ; body colour variable; belly rarely bluish **8**

3 Chin barbel present **4**
3' Chin barbel absent **7**

4 Ventral fins long, reaching to midpoint of anal fin ..... ***Physiculus longifilis***
4' Ventral fins short, not reaching beyond origin of anal fin **5**

5 Scale rows in longitudinal series 90-95; vertebrae 46-49 ..... ***Physiculus roseus***
5' Scale rows in longitudinal series 115-128; vertebrae 51-59 ..... **6**

6 Light organ placed well behind level of insertion of pelvic fins; distance between light organ and anus ca. equal to diameter of light organ; -11 scales between first dorsal fin origin and lateral line ..... ***Physiculus therosideros***
6' Light organ close to level of pelvic fin insertion; distance between light organ and anus approximately twice diameter of light organ; 11-16 scales between first dorsal fin origin and lateral line ..... ***Physiculus luminosus***

7 Jaw teeth small, villiform, in bands; pectoral fin rays 19-23; orbit diameter 3.5-4.5% SL ..... ***Gadella norops***
7' Jaw teeth large, canine-like, in a single row; pectoral fin rays 25-26; orbit diameter 4.7-5.3% ..... ***Gadella brocca*** sp. nov.

8 Pelvic fins with two rays ..... **8'**
8' Pelvic fins with more than two rays, usually 5-7 ..... **9**

9 Pelvic fins reaching beyond anus; 61-65 second dorsal fin rays; 57-62 anal fin rays ..... ***Laemonema palauense***
9' Pelvic fins not reaching anus; 51-56 second dorsal fin rays; 50-52 anal fins rays ..... ***Laemonema filodorsale***

10 Prolonged ray of first dorsal fin greatly exceeding head length; anal fin single; orbit diameter small, less than length of chin barbel ..... ***Lepidion inosimae***
10' Longest ray of first dorsal not greatly exceeding length of head; anal fin usually divided into wo; orbit diameter large, greater than length of barbel ..... ***Mora moro***

ACKNOWLEDGEMENTS

We are grateful to Bernard SÉRET (ORSTOM Paris) and Jacques RIVATON (ORSTOM Nouméa) for the opportunity to study New Caledonian morids held in their respective research collections. We thank Helen CASEY

Source : MNHN, Paris

Source : MNHN, Paris

3

First record of the Eucla cod, *Euclichthys polynemus* McCulloch, (Teleostei, Paracanthopterygii, Euclichthyidae) from New Caledonia, southwest Pacific Ocean, with notes on morphological characters

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ABSTRACT

The Australasian Eucla cod, *Euclichthys polynemus* McCulloch, family Euclichthyidae, is described for the first time from the New Caledonian Exclusive Economic Zone where it appears to be restricted to seamount "B" (24°55'S, 168°21'E) on the northern Norfolk Ridge southeast of New Caledonia. The Eucla cod is superficially very similar to morid cods (family Moridae), but can be distinguished by a long filamentous pelvic fin with four to six distal elements, an unequally divided anal fin, and an asymmetrical caudal fin.

ROBERTS, C. D. & C. D. PAULIN, 1997. — First record of the Eucla cod, *Euclichthys polynemus* McCulloch, (Teleostei, Paracanthopterygii, Euclichthyidae) from New Caledonia, southwest Pacific Ocean, with notes on morphological characters. *In*: SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 43-50. Paris ISBN 2-85653-500-3.

Source : MNHN, Paris

RÉSUMÉ

Premier signalement d'*Euclichthys polynemus* McCulloch (Teleostei, Paracanthopterygii, Euclichthyidae) de Nouvelle-Calédonie (Océan Pacifique Sud-Ouest), et remarques sur les caractères morphologiques de l'espèce

L'espèce Australo-asiatique, *Euclichthys polynemus* McCulloch, de la famille des Euclichthyidae, est décrite pour la première fois de la Zone Économique Exclusive de Nouvelle-Calédonie, où elle semble limitée au mont sous-marin "B" (24°55'S, 168°21'E), situé sur la partie nord de la Ride de Norfolk au sud-est de la Nouvelle-Calédonie. Ce poisson ressemble à un moridé (famille Moridae), mais s'en distingue par sa nageoire pelvienne formée de quatre-six rayons allongés et filamenteux, sa nageoire anale divisée inégalement, et sa nageoire caudale asymétrique.

INTRODUCTION

The Eucla cod is a rare benthopelagic fish found in deep slope waters of Australia and New Zealand (COHEN *et al.*, 1990). In general appearance it is a typical gadiform with an elongate tapering body covered with small cycloid scales, a large head, mouth and eye, fins without spines, and pelvic fins thoracic in position. The placement of *Euclichthys polynemus* in Gadiformes has never been questioned, but its family relationships remain enigmatic and controversial. Eucla cods are similar to morid cods in general body shape and appearance and the two have often been confused and thought to be closely related. However, several internal characters (e.g. COHEN, 1984) indicate they are only distantly related and, therefore, the morid cods of New Caledonia are reviewed separately (see PAULIN & ROBERTS, this volume).

Traditionally the Eucla cod has been considered to belong to the family Moridae (McCULLOCH, 1926: 174; SCOTT, 1962: 82; McCANN, 1972: 630) and is still often classified for convenience as a morid (LAST *et al.*, 1983: 232; PAXTON & HANLEY, 1989: 299). SVETOVIDOV (1969) showed that the Eucla cod is not a morid due to the absence of a connection between the swimbladder and auditory capsule, but its systematic position was considered unclear. PAULIN (1983: 88) noted that *E. polynemus* shared with *Melanonus gracilis* (Melanonidae) three distinct characters: olfactory lobes close to the brain, absence of a swimbladder-inner ear connection, and possession of five hypurals in the caudal skeleton. On the basis of these characters PAULIN (1983) suggested that Eucla cod occupied an evolutionary position between Moridae and Gadidae, and should be placed close to or within the family Melanonidae. It was subsequently placed in Melanonidae by MAY & MAXWELL (1986: 197), but has also been placed in the family Gadidae (AYLING & COX, 1982: 150), in its own family Euclichthyidae (COHEN, 1984: 264; HOWES, 1988: 23; PAULIN, 1990: 170), and classified as *incertae sedis* by FAHAY & MARKLE (1984: 266).

Currently, general consensus is that *Euclichthys polynemus* should be placed in its own family, Euclichthyidae, largely because it can not be placed in any other recognized gadiform family (COHEN, 1984) and has some unique morphological characters. Recent critical and rigorous studies of gadiform systematics (COHEN, 1989 and papers therein) have failed to resolve the relationships of *Euclichthys* which was classified by four independent studies as: close to the morids and rattails, a sister group of the macrourids, a macrouroid family, and among the gadoids. With good reason it was described by COHEN (1989: 2) as still a "problem genus".

As part of two cooperative fish research programmes Centre ORSTOM de Nouméa and the Museum of New Zealand "Te Papa Tongarewa" (formerly the National Museum of New Zealand), Eucla cods were observed and collected by the authors who participated in exploratory trawling on seamounts during R. V. *"Alis"* cruises BERYX 2 and 11. In addition, preserved specimens collected during an earlier ORSTOM research cruise off New Caledonia and held in the collection of ORSTOM in Muséum National d'Histoire Naturelle, Paris, were studied. This new material provides the basis for the present review and enables the rare Eucla cod to be described for the first time from the New Caledonian Exclusive Economic Zone.

Source : MNHN, Paris

METHODS

Counts and measurements follow the methods used by HUBBS & LAGLER (1964) and PAULIN (1989a). Precise counts of scale rows in longitudinal series from damaged specimens are difficult to make and these data are approximate; count of pelvic fin rays is the number of distal elements, it is unclear from the specimens examined whether the first ray is unbranched or branched basally. Morphometric data in the text are expressed as ranges and are given in mm, with percent standard length in parentheses. Vertebral counts include both ural centra. The synonymy includes valid name and Australian and New Zealand nomenclature, plus anatomical descriptions. Specimens examined are listed under the species account; nine specimens were X-rayed and these are denoted by an asterisk. Because morid cods are externally so similar in appearance to Eucla cod, Moridae are included at family level in the key to aid field identifications.

Institutional abbreviations follow the international standards fixed by LEVITON *et al.* (1985): NMNZ = Museum of New Zealand, Wellington (formerly the National Museum of New Zealand); MNHN = Muséum national d'Histoire naturelle, Paris. Eucla cods were collected off New Caledonia during three ORSTOM research cruises: CHALCAL 2 (see cruise report by RICHER DE FORGES *et al.*, 1987; and exploration summary by RICHER DE FORGES, 1990), BERYX 2 (GRANDPERRIN & LEHODEY, 1992), and BERYX 11 (GRANDPERRIN *et al.*, 1993).

SYSTEMATIC ACCOUNT

KEY TO EUCLA COD AND MORIDAE FROM NEW CALEDONIAN WATERS

1 Pelvic fin with 4-6 long filamentous elements; anal fin in two unequal parts, a short high anterior portion and a large low posterior portion, length of base of first portion about three times length of second; caudal fin asymmetrical, ventral lobe slightly produced ..... **Euclichthyidae** (*Euclichthys polynemus*)

1' Pelvic fin with 5-6 rays, 0-2 long and filamentous; anal fin single or divided into two equal portions; caudal fin symmetrical..... **Moridae** (see PAULIN & ROBERTS, this volume)

Family **EUCLICHTHYIDAE**

DIAGNOSIS. – First neural spine free; no otophysic connection; caudal fin asymmetrical with four hypurals nearly fused to two (COHEN, 1984: 263). Cranial muscle *adductor arcus palatini* divided by a strong ligament running from the lateral ethmoid and palatine to the medial face of the hyomandibular (HOWES, 1988: 24).

REMARKS. – Family interrelationships are poorly understood. Comprising one monotypic genus (SVETOVIDOV, 1969; COHEN, 1984; PAULIN, 1989b) for the Eucla cod which is benthopelagic at 200-1,000 m depth, found in deep subtropical-warm temperate Australasian waters, no commercial importance.

Genus ***EUCLICHTHYS*** McCulloch, 1926

Euclichthys McCulloch, 1926: 174 (masculine; type species *Euclichthys polynemus* McCulloch by original designation, also monotypic).

DIAGNOSIS. – As for family.

Source : MNHN, Paris

Euclichthys polynemus McCulloch, 1926

Fig. 1, Table 1

Euclichthys polynemus McCulloch, 1926: 174, plate 44, fig. 2 (original description, type locality off Eucla, Great Australian Bight, Australia).

Euclichthys polynemus: MUNRO, 1938: 62, fig. 439 (description). — SCOTT, 1962: 82, fig. (description). — McCANN, 1972: 630 (description, New Zealand). — AYLING & COX, 1982: 150, fig. (description). — LAST *et al.*, 1983: 232, fig. 21.3 (description). — COHEN, 1984: 263 & 264, fig. 137 (description, classification). — FAHAY & MARKLE, 1984: 266, Table 72 (description). — MAY & MAXWELL, 1986: 197, fig. (description). — HOWES, 1987: 628, fig. 2c (palatine articulation). — HOWES, 1988: 23, figs. 14-15 (cranial muscles and ligaments). — MARKLE, 1989: 82, figs. 11A, 16, 17A (pectoral and caudal skeleton, classification). — NOLF & STEUBAUT, 1989: 92, fig. 1B (otolith description, classification). — OKAMURA, 1989: 138, figs. 2B, 3C, 5 (cranium, vertebral region and luminous organ, classification). — PATTERSON & ROSEN, 1989: 16, figs. 6, 12A (caudal skeleton and dorsal gill arch). — PAULIN *et al.*, 1989: 121 (diagnosis, key). — PAXTON & HANLEY, 1989: 299 (synonymy). — COHEN *et al.*, 1990: 18, fig. 29 (description). — HOWES & CRIMMEN, 1990: 170, fig. 15D (basihyal and dorsohyals). — PAULIN, 1990: 170, fig. (description, New Zealand).

MATERIAL EXAMINED. — 13 specimens, 187.5-273.0 mm SL.

Norfolk Ridge. CHALCAL 2: stn CH7, 24°55.50'S, 168°21.10'E (seamount "B", southeast of New Caledonia), 494-590 m depth, bottom trawl, R. V. "*Coriolis*", 28 October 1986: 4 specimens, 209-273 mm SL (MNHN 1995-1001)*.

BERYX 2: stn 5, 24°56.05'S, 168°21.20'E (seamount "B", southeast of New Caledonia), 535-545 m depth, bottom trawl, R. V. "*Alis*", 24 October 1991: 3 specimens, 187.5-203 mm SL (NMNZ-P.27455)*. — Stn 19, 24°55.80'S, 168°22.30'E (seamount "B", southeast of New Caledonia), 550-700 m depth, bottom trawl, 30 October 1991: 2 specimens, 213-239 mm SL (NMNZ-P.27475)*.

BERYX 11: stn C3, 24°54.60'S, 168°21.60'E (seamount "B", southeast of New Caledonia), 502-610 m depth, bottom trawl, R. V. "*Alis*", 14 October 1992: 2 specimens, 230-243.5 mm SL (NMNZ-P.29408) — Stn C4, 24°50.75'S, 168°21.86'E (seamount "B", southeast of New Caledonia), 550-920 m depth, bottom trawl, 14 October 1992: 2 specimens, 212-243 mm SL (NMNZ-P.29228).

DIAGNOSIS. — As for family. *Euclichthys polynemus* differs from all morid cods, with which it is superficially most similar, by lacking a horizontal diaphragm within the posterior chamber of the swim bladder (PAULIN, 1988), no swim bladder-auditory capsule connection (SVETOVIDOV, 1969), *adductor arcus palatini* muscle divided by a strong ligament (HOWES, 1988), and only a single sulcus groove on the otoliths. Field characters which enable the Eucla cod to be distinguished from morid cods include the long filamentous pelvic fins comprised of four to six distal elements, the unequally divided anal fin, and the asymmetrical caudal fin.

DESCRIPTION. — Body elongate, narrow and compressed posteriorly, greatest depth at origin of first dorsal fin, thereafter tapering to a narrow caudal peduncle. Snout rounded, its length less than diameter of the eye. Teeth small villiform, none on vomer. First dorsal fin short, high, first ray minute, fin separated from second by a short space. Anal fin long with a short high anterior portion, followed by a long, low posterior portion with fin rays increasing in length posteriorly. Pelvic fins comprising four (COHEN, 1990), five (n = 1) or six (n = 12) long filamentous distal elements reaching beyond anus. Caudal fin rounded, asymmetrical with a longer lower lobe.

Measurements (in mm, % SL in parenthesis). Standard length 187.5-273.0; head length 36.9-59.5 (19.6-21.7), head width 16.5-25.6 (7.5-10.3); body depth at origin of first dorsal fin 28.0-52.1 (14.9-19.2); caudal peduncle depth 3.4-4.8 (1.5-1.9); orbit diameter 10.8-17.4 (5.5-6.3); interorbital width 7.1-10.6 (3.0-4.1); snout length 9.1-15.1 (4.8-6.1); maxilla length 21.4-35.5 (10.5-13.0); length of pectoral fin 26.4-43.5 (12.5-16.3); length of pelvic fin 44.0-88.0 (22.5-32.3); length of longest ray of first dorsal fin 28.3-38.5 (12.7-15.5), length of longest ray of second dorsal fin 15.1-22.8 (7.3-9.4); length of longest ray of anal fin 19.5-28.7 (8.9-11.7); predorsal length 42.1-72.6 (22.4-32.2); preanal length 77.5-104.5 (35.2-42.4).

Meristics. Frequency distributions of selected meristic characters are given in Table 1. First dorsal fin rays 1 + 12-15; second dorsal fin rays 78-88; anal fin rays 14-17 + 75-88 = 94-103; pectoral fin rays 18-22; pelvic fin ray distal elements 5-6; total caudal fin rays 39-44; gill rakers 5-6 + 15-18; oblique scale rows in longitudinal series 130-150; vertebrae 68-73.

Source : MNHN, Paris

TABLE 1. — Frequency distributions of selected meristic characters of *Euclichthys polynemus* McCulloch, 1926, from New Caledonia. Count includes 2 ural centra of vertebrae.

2nd dorsal fin rays	78	79	80	81	82	83	84	85	86	87	88
	1	-	-	2	2	-	1	1	3	-	3
1st + 2nd anal fin rays	94	95	96	97	98	99	100	101	102	103	
	1	-	-	-	3	-	4	1	-	2	
Caudal fin rays	39	40	41	42	43	44					
	1	4	3	3	-	2					
Vertebrae	68	69	70	71	72	73					
	3	1	2	1	1	1					

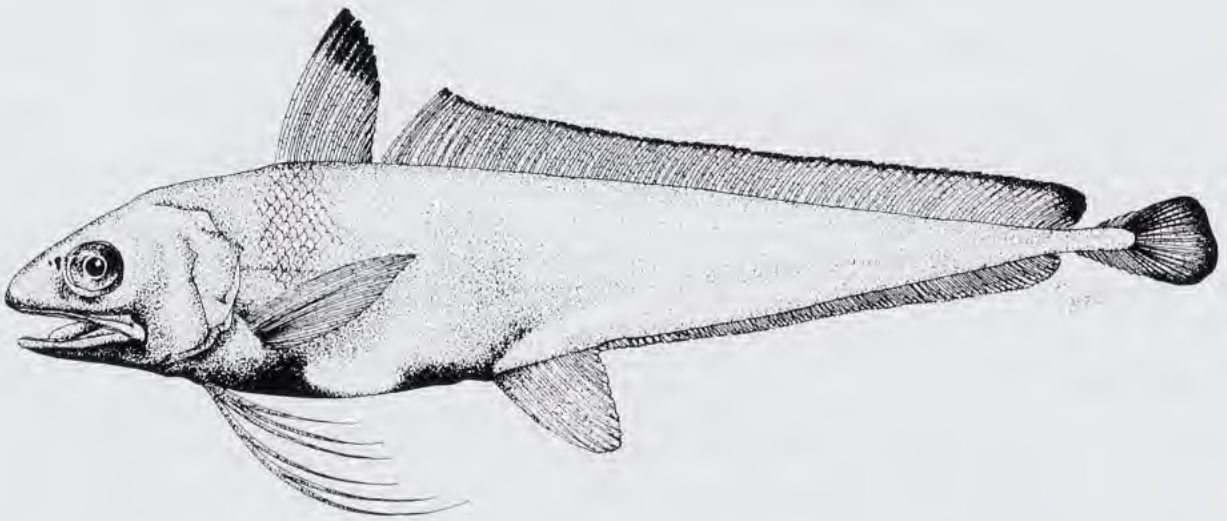

FIG. 1. — *Euclichthys polynemus* McCulloch, 1926, specimen of 213 mm SL (NMNZ-P.27475), BERYX 2, stn 19, 24°54.2'S, 168°21.7'E (seamount "B", southeast of New Caledonia), bottom trawl at 510-519 m depth, R. V."*Alis*", 30 October 1991. Drawn by Helen Casey.

Coloration (from fresh and frozen specimens). Head and body silvery white, more silvery laterally and white on mid portion of abdomen. Lips, throat, branchiostegals, anterior abdomen and region around anus deep bluish black. First dorsal fin black with a prominent white spot medially, tips of second dorsal fin black. Anal fin dusky brown. Pectoral fin pale.

Coloration (from preserved specimens). Head and body pale pinkish to yellowish tan, lower sides of head and operculum silvery. Lips, throat and branchiostegals black, becoming bluish towards abdomen. Region around anus bluish black; base of first part of anal fin pale. First dorsal fin bluish black basally, white medially and black on distal third; second dorsal with black margin; anal fin rays faint brownish black. Pectoral fin pale.

Source : MNHN, Paris

DISTRIBUTION. — Known from specimens taken on Seamount "B" (24°55'S, 168°21'E), southeast of New Caledonia, at 494-920 m depth; also known from New Zealand waters north of the Chatham Rise, at 250-920 m depth, and southern Australian waters from Queensland to Western Australia and off the Northwest Shelf, at 250-820 m depth (MAY & MAXWELL, 1986: 197; PAXTON & HANLEY, 1989: 299; PAULIN, 1990: 170; this study).

Given the wide distribution of Eucla cod in Australasian waters and its benthopelagic life style, it is surprising that *E. polynemus* has only been taken from one locality (seamount "B") in New Caledonian waters. This restricted distribution appears to be real because the fish fauna of neighbouring seamounts has been explored by the same vessels using the same sampling gear in similar habitats without capturing Eucla cod (e.g., see RICHER DE FORGES, 1990, and cruise reports by RICHER DE FORGES *et al.*, 1987; GRANDPERRIN & LEHODEY, 1992; GRANDPERRIN *et al.*, 1993). PAULIN & ROBERTS (1997) record the morid *Tripterophycis svetovidovi* as also confined to seamount "B".

Intriguing differences in fish faunal composition, dominant benthos and substratum type as well as differences in topographic and hydrographic characteristics have been observed between adjacent seamounts in this area southeast of New Caledonia (e.g., RICHER DE FORGES, 1987; LEHODEY *et al.*, 1993; pers. obs.). These differences are not yet fully documented and are far from being understood. Further survey of the biotic and abiotic characteristics of these rich Norfolk Ridge seamounts is required.

REMARKS. — Meristic and morphometric characters of *Euclichthys polynemus* have not been well described previously and, therefore, there are little data available on character variation. In the original description McCULLOCH (1926) had 28 specimens, but only described characters from the holotype. Most subsequent taxonomic treatment of the species simply reproduced McCULLOCH's data without describing character variation from additional specimens. A revision of Eucla cod based on Australian specimens particularly from the type locality off Eucla is needed.

In general, meristic characters of New Caledonian specimens agree with available of *E. polynemus* from Australia and New Zealand, e.g., second dorsal fin rays 78-88, cf. 74-88 (McCULLOCH, 1926; McCANN, 1972; MAY & MAXWELL, 1986; PAULIN, 1990); caudal fin rays 39-44, cf. 34-41 (McCANN, 1972; FAHAY & MARKLE, 1984); vertebrae 68-73, cf. 70 (FAHAY & MARKLE, 1984).

There is some confusion about the number of pelvic fin rays; counts in the literature range from 4-6 rays and 0-3 branches. McCULLOCH (1926: 174, plate 44 fig. 2) described the pelvic fin as narrow based, composed of "five free filamentous rays, of which the anterior is divided into two" and illustrated the holotype with five rays, the first bifurcating at mid-length giving a count of six elements distally. In subsequent descriptions including the present study it is unclear whether the first pelvic ray is bifid or trifid (branching basally) or single: McCANN (1972: 632, fig. 15) recorded "five elongated undivided rays" with five distal elements illustrated; LAST *et al.* (1983: 232, fig. 21.3) gave "5 separate elements" and reproduced McCULLOCH's figure; COHEN (1984, fig. 137) illustrated six distal elements; FAHAY & MARKLE (1984, table 72) listed five rays; MAY & MAXWELL (1986: 197) stated "4 long rays...first ray ...branched into 3 filaments about one-third distance from its base" and reproduced McCULLOCH's figure; and COHEN *in* COHEN *et al.* (1990: 18, fig. 29) recorded "4 long, completely separate filamentous rays" and illustrated four distal elements. The present count of 5-6 pelvic fin ray elements is, nevertheless, within the published variation of 4-6.

Only count of total anal fin rays appears to differ from previous descriptions, viz.: 94-103, cf. 92 (McCULLOCH, 1926 and subsequently repeated by FAHAY & MARKLE, 1984, and MAY & MAXWELL, 1986). Two Eucla cod described from the Three Kings Ridge, northern New Zealand EEZ, have been reported with 90-94 total anal fin rays (PAULIN, 1990).

Due to the absence of character variation in published counts of anal fin rays, it is difficult to assess the significance of the higher range of counts found in New Caledonian specimens. Therefore, a conservative approach is taken and this difference is here attributed to the very low sample size from Australian waters. It is expected that further investigation of character variation in Australian specimens will show an overlapping range in anal fin ray count with those from New Caledonia. Clearly, further work involving detailed character description and analysis is needed to help resolve euclichthyid systematic problems at both the species and family level.

Source : MNHN, Paris

ACKNOWLEDGEMENTS

We are grateful to Bernard SÉRET for the opportunity to study the New Caledonian specimens held in ORSTOM, Paris. We thank Helen CASEY (Museum of New Zealand) for her careful artwork in preparing the illustration, Trevor WILLIS (Museum of New Zealand) for preparing radiographs. Funding for visits by the authors to ORSTOM, Nouméa, was provided by the Ministry of Foreign Affairs, Paris, assisted by the French Embassy, Wellington and ORSTOM Nouméa - this support is gratefully acknowledged. René GRANDPERRIN, Jacques RIVATON and Michel KULBICKI (ORSTOM Nouméa) kindly gave us much friendly assistance during our visits to New Caledonia. Also, we thank captain Michel LE BOULCH, second captain Hervé LE HOUARNO, the officers and crew of R. V. *"Alis"* for their help in collecting Eucla cod and other deep water fishes during exploratory trawling operations off New Caledonia. Jean-Claude STAHL (Museum of New Zealand) provided the French "Résumé". The paper benefited from critical comments given by an anonymous referee.

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Source : MNHN, Paris

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Source : MNHN, Paris

4

Deepwater Ophidiiform fishes from off New Caledonia with six new species

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ABSTRACT

During the ORSTOM explorations (1985-92) off New Caledonia 149 specimens of the order Ophidiiformes were caught. They represent 24 species of which the following are new: *Neobythites bimaculatus, N. longiventralis, N. neocaledoniensis, N. pallidus, N. zonatus* and *Parasciadonus pauciradiatus*. All 24 species are illustrated and a key is provided.

RÉSUMÉ

Poissons Ophidiiformes des eaux profondes de Nouvelle-Calédonie, avec la description de six espèces nouvelles.

Au cours des campagnes de prospection effectuées par l'ORSTOM en Nouvelle-Calédonie, 149 spécimens de brotules (Ophidiiformes) ont été récoltés. Ils représentent 24 espèces dont six sont nouvelles : *Neobythites bimaculatus, N. longiventralis, N. neocaledoniensis, N. pallidus, N. zonatus* et *Parasciadonus pauciradiatus*. Les 24 espèces sont illustrées et une clef est fournie.

NIELSEN, J. G., 1997. — Deepwater ophidiiform fishes from off New Caledonia with six new species. *In*: SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 51-82, Paris ISBN 2-85653-500-3.

Source : MNHN, Paris

INTRODUCTION

During the explorations (1985-92) of the New Caledonian bathyal fauna 149 specimens belonging to the order Ophidiiformes were caught by the ORSTOM expeditions "BERYX 11", "BIOCAL ", "CHALCAL 2", "BIOGEOCAL", " MUSORSTOM 4, 5 and 6" and " SMIB 2". The material represents three families, 15 genera and 24 species. A few of the genera are so much in need of a revision that the specific identifications are somewhat doubtful. Five new species of *Neobythites* and one of *Parasciadonus* are here described.

MATERIAL AND METHODS

The material here examined is deposited in the Muséum national d'Histoire naturelle (MNHN), Paris, in the Museum of New Zealand (NMNZ), Wellington, and in the Zoological Museum, University of Copenhagen (ZMUC), Copenhagen. Counts and measurements follow HUBBS & LAGLER (1958) and COHEN & NIELSEN (1978) except for the vertebral count which includes the ural centra as "one" and for the measurements which use the upper jaw symphysis as the anteriormost point. The meristic characters are not given for all specimens of already described species. Detailed illustrations are made for the new species while allready described species are illustrated by a less elaborate drawing.

SYSTEMATIC ACCOUNT

KEY TO NEW CALEDONIAN DEEPWATER OPHIDIIFORM GENERA

1 Scales absent absent **2**
1' Scales present (Ophidiidae) **4**

2 Skin loose, anal fin-rays equal in length to opposing dorsal fin-rays (Aphyonidae) **3**
2' Skin not loose, anal fin-rays longer than opposing dorsal fin-rays (Carapidae) ..... ***Pyramodon***

3 Depth of body at anus 10% or more of standard length, anterior gill arch with 3-14 long rakers ..... ***Aphyonus***
3' Depth of body at anus 7% or less of standard length, no long rakers on anterior gill arch ..... ***Parasciadonus***

4 Ventral fins attached below eye, no large spines on operculum ..... ***Ophidion***
4' Ventral fins attached posterior to eye, operculum with or without spines **5**

5 Spines on operculum and preoperculum extending well posterior of head **6**
5' Spines on operculum and preoperculum absent or present but never extending posterior of head **7**

6 Prominent bifid spine on snout, ventral fins placed close together each with one ray ..... ***Acanthonus***
6' No spine on snout, ventral fins widely separated each with two rays ..... ***Tauredophidium***

7 Anterior gill arch with four long rakers ..... ***Pycnocraspedum***
7' Anterior gill arch with seven or more long rakers **8**

8 Body long and slender, depth at anus at least ten times in standard length ..... ***Porogadus***
8' Body less slender, depth at anus always less than ten times in standard length **9**

9 Opercular spine weak or absent **10**
9' Opercular spine strong **12**

10 Head depressed and with many sharp spines ..... ***Alcockia***
10' Head not depressed and without spines **11**

Source : MNHN, Paris

11 Preoperculum extending posteriorly almost to opercular edge, one ventral fin-ray, no pectoral fin-rays free ..... ***Bassozetus***
11' Preoperculum not extended posteriorly, two ventral fin-rays, lower pectoral fin-rays long and free ..... ***Bathyonus***
12 Lower pectoral fin-rays longer and free, ventral fin with two rays ..... ***Dicrolene***
12' Lower pectoral fin-rays not longer and free, 1-2 rays in each ventral fin **13**
13 Two rays in each ventral fin, two median basibranchial tooth patches ..... ***Neobythites***
13' One ray in each ventral fin, one median basibranchial tooth patch **14**
14 Ventral fin-ray extending beyond anus, pectoral fin placed low on body ..... ***Homostolus***
14' Ventral fin-ray not reaching halfway to anus, pectoral fin placed near midline ..... ***Monomitopus***

Family **CARAPIDAE**

Vertical fins united, scales and supramaxilla absent, anal fin-rays longer than opposing dorsal fin-rays, oviparous.

Genus ***PYRAMODON*** Smith & Radcliffe, 1913

Ventral fins present, origin of dorsal and anal fins approximately opposite each other, pectoral fin-rays 22-30. Four species recognized (MARKLE & OLNEY, 1990: 331).

Pyramodon ventralis Smith & Radcliffe, 1913

Fig. 1

Pyramodon ventralis Smith & Radcliffe *in* Radcliffe, 1913: 175, pl. 17, fig. 3 (type locality: 0°50'S, 128°12'E).

Pyramodon ventralis: MARKLE & OLNEY, 1990: 334.

MATERIAL EXAMINED. — **New Caledonia**. MUSORSTOM 4: stn CP 195, 18°54.80'S, 163°22.20'E, 470 m depth, beam trawl, R. V. "*Vauban*", 19 September 1985: 1 specimen, female 205 mm (MNHN 1994-703).

DESCRIPTION. — Number of fin-rays in dorsal 120, anal 109, pectoral 25, vertebrae 14+51, three long rakers on anterior gill arch, anterior dorsal fin-ray above vertebra no. 5, anterior anal fin-ray below dorsal fin-ray no. 3 and vertebra no. 7. Fang-like teeth near symphysis in both jaws.

FIG. 1. — *Pyramodon ventralis* Smith & Radcliffe, 1913, female 205 mm (MNHN 1994-703).

Source : MNHN, Paris

REMARKS. — *P. ventralis* differs from all other species of *Pyramodon* by not having black margins of dorsal and anal fins and body only lightly pigmented, and by the position of the origin of the dorsal and anal fins.

DISTRIBUTION. — Known from the Indo-West Pacific on the upper continental slope.

Family **OPHIDIIDAE**

Vertical fins united, scales and supramaxilla developed, dorsal fin-rays equal to or longer than opposing anal fin-rays.

Genus ***ACANTHONUS*** Günther, 1878

A monotypic genus. See description below.

Acanthonus armatus Günther, 1878
Fig. 2

Acanthonus armatus Günther, 1878: 23 (type locality: 2°33'S, 144°4'E).

Acanthonus armatus: SHCHERBACHEV, 1980: 109.

MATERIAL EXAMINED. — 6 specimens, 215-335 mm.
New Caledonia. BIOGEOCAL: stn CP 250, 21°24.63'S, 166°28.21'E, 2350 m depth, beam trawl, R. V. *"Coriolis"*, 15 April 1987: 3 specimens, 215-335 mm (MNHN 1994-704) and 1 specimen, 250 mm (ZMUC-P.771149). — Stn CP 272, 21°00.04'S, 166°56.94'E, 1615-1710 m depth, beam trawl, 20 April 1987: 1 specimen, 260 mm (MNHN 1994-705). — Stn CP 329, 21°09.05'S, 166°40.08'E, 2310-2315 m depth, beam trawl, 4 May 1987: 1 specimen, 220 mm (MNHN 1994-706).

DESCRIPTION. — *A. armatus* is characterized by a large head and tapering body, ventral fins placed slightly posterior to orbit, bifid spine on snout, long opercular spine, and well-developed spines on lower angle of preoperculum.

DISTRIBUTION. — Numerous specimens known from the tropical parts of all oceans at depth between about 1500 and 4150 m.

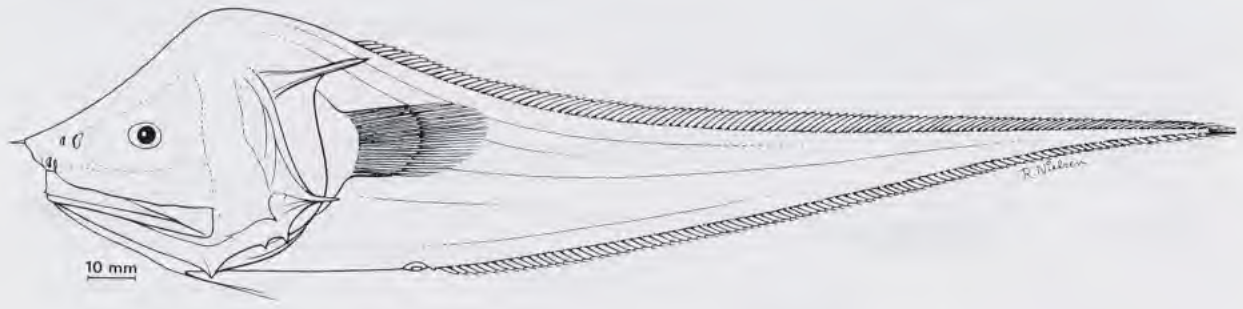

FIG. 2. — *Acanthonus armatus* Günther, 1878, 220 mm (MNHN 1994-706).

Source : MNHN, Paris

Genus *ALCOCKIA* Goode & Bean, 1896

A monotypic genus. See description below.

Alcockia rostrata (Günther, 1887)
Fig. 3

Porogadus rostratus Günther, 1887: 113, pl. 24 (type locality: 2°55'N, 124°53'E).

Alcockia rostrata: SHCHERBACHEV, 1980: 115.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn CP 17, 20°34.54'S, 167°24.68'E, 3680 m depth, beam trawl, R. V. *"Jean Charcot"*, 14 August 1985: 2 specimens, female + ?, 165-207 mm (MNHN 1994-707).

FIG. 3. — *Alcockia rostrata* (Günther, 1887), 207 mm (MNHN 1994-707).

DESCRIPTION. — An elongate fish with depressed head provided with well-developed spines, length of snout twice eye diameter, suborbital bones membranous, maxillary strongly sheathed posteriorly, and opercular spine flat and weak. Number of fin-rays in dorsal 111-112, caudal 8, anal 87-94, pectoral 23, ventral 2, vertebrae 16 + 53-56, long rakers on anterior gill arch 7, anterior dorsal fin-ray above vertebra no. 7, anterior anal fin-ray below dorsal fin-ray no. 20-22 and vertebra no. 19.

DISTRIBUTION. — A few specimens known from abyssal depths between East Africa and New Caledonia.

Genus *BASSOZETUS* Gill, 1884

Snout somewhat inflated, horizontal diameter of eye window much shorter than snout, upper jaw ends well posterior to eye, opercular spine weak or absent, preoperculum almost reaching posterior margin of operculum, ventral fins with one ray, lateral line indistinct. This genus holds 11 nominal species and is much in need of a revision. The 15 specimens here described are referred to three species in the following key:

1 Large scales (15-20 scales between origin of anal fin and dorsal fin), 21-22 pectoral fin-rays, depth at anus 9.0-9.6 % SL ..... ***B. elongatus***

1' Small scales (30-35 scales between origin of anal fin and dorsal fin), 26-29 pectoral fin-rays, depth at anus (in specimens larger than 225 mm SL) 10-14.5 % SL **2**

2 Long rakers on anterior gill arch 13 ..... ***B. robustus***

2' Long rakers on anterior gill arch 17-21 ..... ***B. glutinosus***

Source : MNHN, Paris

Bassozetus elongatus Smith & Radcliffe, 1913
Fig. 4

Bassozetus elongatus Smith & Radcliffe *in* Radcliffe, 1913: 157, pl. 11, fig. 4 (type locality: 0° 08'S, 121°19'E).

MATERIAL EXAMINED. — 3 specimens, 450-480 mm.

New Caledonia. BIOCAL: stn CP 05, 21°16.49'S, 166°43.56'E; 2340 m, beam trawl, R. V. *"Jean Charcot"*, 11 August 1985: 1 specimen, male 450 mm (MNHN 1994-708). — Stn CP 72, 22°09.02'S, 167°33.18'E, 2100 m depth, beam trawl, 4 September 1985: 1 specimen, female 475 mm (MNHN 1994-709).

BIOGEOCAL: stn CP 321, 21°12'S, 166°59.85'E, 2190-2205 m depth , beam trawl, R. V. *"Coriolis"*, 3 May 1987: 1 specimen, male 480 mm (ZMUC-P.771150).

DESCRIPTION. — Elongate body, number of dorsal fin-rays 122-128, caudal 8, anal 104-108, pectoral 21-22, vertebrae 11-12 + 56-59 (totally 68-70), long rakers on anterior gill arch 12-14, anterior dorsal fin-ray above vertebra no.4, anterior anal fin-ray below dorsal fin-ray no. 21-23 and vertebra no. 13-14, sagittal otolith small, 15-20 scale-rows between origin of anal and dorsal fins, depth of body at origin of anal fin 9.0-9.6 % SL.

DISTRIBUTION. — Caught off New Caledonia at 2100-2340 m of depth. Elsewhere known from the Philippines at 1993 m of depth.

FIG. 4. — *Bassozetus elongatus* Smith & Radcliffe, 1913, female 475 mm (MNHN 1994-709).

Bassozetus glutinosus (Alcock, 1890)
Fig. 5

Bathyonus glutinosus Alcock, 1890: 211 (type locality: 18°26'N, 85°24'E).

Bassozetus glutinosus: SHCHERBACHEV, 1980: 119.

MATERIAL EXAMINED. — 11 specimens, 92-292 mm.

New Caledonia. BIOCAL: stn CP 23, 22°45.84'S, 166°20.33'E, 20-40 m depth, beam trawl, R. V. *"Jean Charcot"*, 28 August 1985: 1 specimen, male 255 mm (MNHN 1994-710). — Stn CP 27, 22°05.52'S; 166°26.41'E, 1850 m depth, beam trawl, 28 August 1985: 2 specimens, female + ?, 145-292 mm (MNHN 1994-711) and 2 specimens, female + ?, 110-225 mm (ZMUC-P.771151-1152). — Stn CP 60, 24°01.45'S, 167°08.43'E, 1530 m depth, beam trawl, 2 September 1985: 1 specimen male 225 mm (MNHN 1994-712).

BIOGEOCAL: stn CP 260, 21°00.00'S, 167°58.34'E, 1820-1980 m depth, beam trawl, R. V. *"Coriolis"*, 17 April 1987: 3 specimens, 150-160 mm (MNHN 1994-713). — Stn CP 265, 21°04.09'S, 167°00.40'E, 1760-1870 m depth, beam trawl, 18 April 1987: 2 specimens, 92-175 mm (MNHN 1994-714).

DESCRIPTION. —Rather elongate body, number of dorsal fin-rays 120-127, caudal 7-8, anal 101-103, pectoral 26-29, vertebrae 13-14 + 52-58 (totally 66-71), long rakers on anterior gill arch 17-21, anterior dorsal fin-ray above vertebra no.3, anterior anal fin-ray below dorsal fin-ray no. 24-26 and vertebra no. 14-16, sagittal otolith small, 30-35 scale-rows between origin af anal and dorsal fins, depth of body at origin of anal fin 8.7-12.4 % SL.

Source : MNHN, Paris

REMARKS. — The depth of body shows a distinct positive allometric growth. It is not possible to compare this character among the three present *Bassozetus spp.* as all the specimens of *B. glutinosus* are much shorter that any of the specimens representing the other two species.

DISTRIBUTION. — Caught off New Caledonia at 1530-2040 m of depth. Elsewhere known from off East Africa to Hawaii (?).

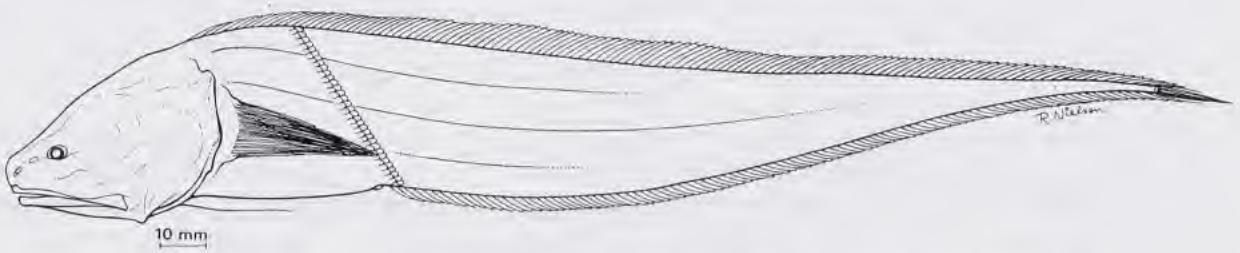

FIG. 5. — *Bassozetus glutinosus* (Alcock, 1890), male 255 mm (MNHN 1994-710).

Bassozetus robustus Smith & Radcliffe, 1913
Fig. 6

Bassozetus robustus Smith & Radcliffe *in* Radcliffe, 1913: 156, pl. 11, fig. 3 (type locality: 10°54'N, 118°26'20''E).

Bassozetus robustus: SHCHERBACHEV, 1980: 122.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn CP 58, 23°55.86'S, 166°41.71'E, 2750 m depth, beam trawl, R. V. *"Coriolis"*, 2 September 1985: 1 specimen, female 520 mm (MNHN 1994-715).

DESCRIPTION. — Body robust, number of dorsal fin-rays 115, caudal 8, anal 96, pectoral 27, vertebrae 15 + 49, long rakers on anterior gill arch 13, anterior dorsal fin-ray above vertebra no. 4, anterior anal fin-ray below dorsal fin-ray no. 25 and vertebra no. 17, sagittal otolith large, 30-35 scale-rows between origin of anal and dorsal fins, depth of body at origin af anal fin 14.5 % SL.

DISTRIBUTION. —Caught off New Caledonia at 2750 m of depth. Elsewhere known from the Philippines and from off West Australia to off the east coast of Africa at depths from 1332-2350 m.

FIG. 6. — *Bassozetus robustus* Smith & Radcliffe, 1913, female 520 mm (MNHN 1994-715)

Source : MNHN, Paris

Genus ***BATHYONUS*** Goode & Bean, 1886

Elongate body, no spines on head except for a weak opercular spine, horizontal diameter of eye window smaller than length of snout, lower rays of pectoral fin long and free, two ventral fin-rays, six caudal fin-rays.

Bathyonus caudalis (Garman, 1899)
Fig. 7

Mixonus caudalis Garman, 1899: 148 (type locality: Gulf of Panama).

Bathyonus caudalis: SHCHERBACHEV, 1980: 127.

MATERIAL EXAMINED. — 3 specimens, 130-195 mm.

New Caledonia. BIOCAL: stn CP 17, 20°34.54'S, 167°24.68'E, 3680 m depth, beam trawl, R. V. *"Jean Charcot"*, 14 August 1985: 2 specimens, males 130-150 mm (MNHN 1994-716). — Stn CP 63, 24°28.69'S, 168°07.72'E, 2160 m depth, beam trawl, 2 September 1985: 1 specimen, male 195 mm (ZMUC-P.77846).

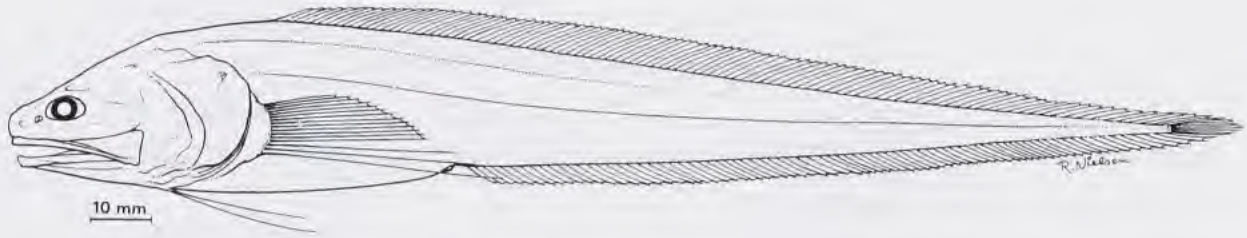

FIG. 7. — *Bathyonus caudalis* (Garman, 1899), male 195 mm (ZMUC-P.77846).

DESCRIPTION. — Scales small (about 30 between origin of anal and dorsal fins), number of fin-rays in dorsal 100, caudal 6, anal 80, pectoral 13-15 + 3 lower rays longer and free, ventral 2, vertebrae 17 + 46, long rakers on anterior arch 13-14, anterior dorsal fin-ray above vertebra no. 6, anterior anal fin-ray below dorsal fin-ray no. 24 and vertebra no. 20.

REMARKS. — Three nominal species are assigned this genus (COHEN & NIELSEN, 1978). According to SHCHERBACHEV (1980) the high number of long gill rakers and the small scales indicate that the present material belongs to *B. caudalis*.

DISTRIBUTION. — Known from off East Africa to the Gulf of Panama at depths between c. 1500 and 3680 m.

Genus ***DICROLENE*** Goode & Bean, 1883

Snout rather blunt, horizontal diameter of eye window almost as long as snout, opercular spine strong, usually three sharp spines on hind margin of preoperculum, lower 5-11 pectoral fin-rays free, two rays in each ventral fin, a paired set and 1-2 median basibranchial tooth patches.

Source : MNHN, Paris

Dicrolene longimana Smith & Radcliffe, 1913
Fig. 8

Dicrolene longimana Smith & Radcliffe *in* Radcliffe, 1913: 144, pl. 8 (type locality: 10°N, 125°06.75'E).

Dicrolene longimana: SHCHERBACHEV, 1980: 134.

MATERIAL EXAMINED. — 3 specimens, 290-320 mm.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 323, 21°18.52'S, 157°57.62'E, 970 m depth, beam trawl, R. V. *"Coriolis"*, 14 October 1986: 1 specimen, female 320 mm (MNHN 1994-717). — Stn CP 324, 21°15.01'S, 157°51.33'E, 970 m depth, beam trawl, 14 October 1986: 1 specimen, female 290 mm (MNHN 1994-718). — Stn DW 337, 19°53.80'S, 158°38'E, 412-430 m depth, Waren dredge, 15 October 1986: 1 specimen, female 310 mm (ZMUC-P.771148).

DESCRIPTION. — Lower 6-7 pectoral fin-rays free and longer than upper ones, two ventral fin-rays divided to base, horizontal diameter of eye window less than twice in interorbital width, no superorbital spine, vomerine dentition forming a small patch, two small pseudobranchial filaments present, two median basibranchial tooth patches, number of fin-rays in dorsal 102, caudal 6, anal 81, vertebrae 14 + 47, long rakers on anterior gill arch 10-11, anterior dorsal fin-ray above vertebra no. 8, anterior anal fin-ray below dorsal fin-ray no. 20 and vertebra no. 17.

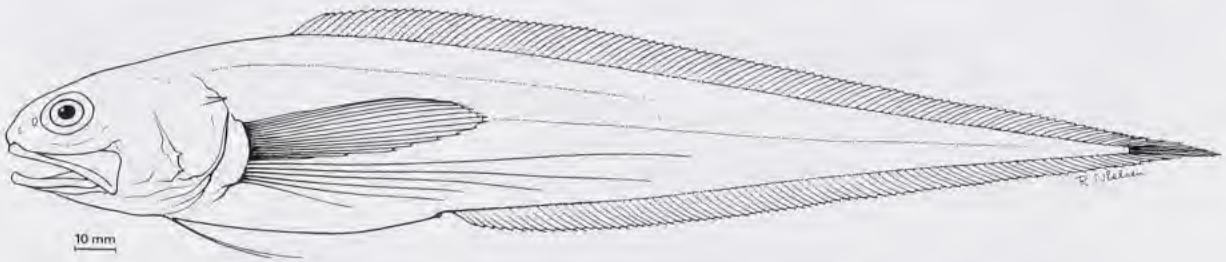

FIG. 8. — *Dicrolene longimana* Smith & Radcliffe, 1913, female 290 mm (MNHN 1994-718).

REMARKS. — The specimens are identified according to SHCHERBACHEV (1980) and NIELSEN & HUREAU (1980). A revision of the genus holding 15 nominal species is much needed.

DISTRIBUTION. — Known from off East Africa, the Philippines, New Caledonia and a questionable record from the Peru-Chile trench (NALBANT & MAYER, 1971) at depths between 412 and 1408 m.

Genus ***HOMOSTOLUS*** Smith & Radcliffe, 1913

Ventral fin with one ray, ending well behind anus, pectoral fins placed low on body, upper jaw slightly protruding, horizontal diameter of eye window about equal to length of snout, one or more sharp spines at lower angle of preoperculum, operculum with one strong spine, long rakers on anterior gill arch 27-42.

Homostolus japonicus Matsubara, 1943
Fig. 9

Homostolus japonicus Matsubara, 1943: 47, fig. in Kamohara (1938: 68) (type locality: Heta, Japan).

Source : MNHN, Paris

MATERIAL EXAMINED. — 23 specimens, 117-185 mm.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 358, 19°38.39'S, 158°47.17'E, 680-700 m depth, beam trawl, R. V. *"Coriolis"*, 18 October 1986: 1 specimen, female 140 mm (MNHN 1994-719). — Stn CC 365, 19°42.82.'S, 158°48'S, 710 m depth, otter trawl, 19 October 1986: 11 specimens, 5 females and 6 males, 117-185 mm (MNHN 1994-720). — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m depth, otter trawl, 19 October 1986: 3 specimens, females 152-161 mm (MNHN 1994-721). — Stn CC 383, 19°40.85'S, 158°46.10'E, 600-615 m depth, otter trawl, 21 October 1986: 3 specimens, females 138-163 mm (MNHN 1994-722). — Stn CC 384, 19°42.40'S, 158°50.80'E, 756-772 m depth, otter trawl, 21 October 1986: 1 specimen, female 163 mm (MNHN 1994-723). — Stn CP 387, 20°53.41'S, 160°52.14'E, 650-660 m depth, beam trawl, 22 October 1986: 4 specimens, 2 females + 2 males, 137-169 mm (ZMUC-P.77847-850).

DESCRIPTION. — Number of dorsal fin-rays 94-95, caudal 8, anal 76-78, pectoral 21-22, vertebrae 13 + 42-43, long rakers on anterior gill arch 36-42, anterior dorsal fin-ray above vertebra no. 5-6, anterior anal fin-ray below dorsal fin-ray no. 20 and vertebra no. 16-17, length of head 23-27.5 % and length of ventral fin-rays 28-36 % SL.

FIG. 9. — *Homostolus japonicus* Matsubara, 1943, female 137 mm (ZMUC-P.77847).

REMARKS. — *H. japonicus* can be separated from the only other species within the genus, *H. acer* Smith & Radcliffe *in* Radcliffe, 1913, by the larger number of long gill rakers (36-42 vs 27) and the longer head (23-27.5 % SL vs 22 % SL).

DISTRIBUTION. — Known from off Japan and New Caledonia at depth between 300 and 772 m.

Genus ***MONOMITOPUS*** Alcock, 1890

Rather robust fish, horizontal diameter of eye window equal to or slightly shorter than snout, opercular spine strong, 2-3 more or less well-developed spines on lower angle of preoperculum, one median basibranchial tooth patch, ventral fins with 1-2? rays in each.

Monomitopus garmani (Smith & Radcliffe, 1913)

Fig. 10

Monomeropus garmani Smith & Radcliffe *in* Radcliffe, 1913: 151, pl. 10, fig. 1 (type locality: 0°36'S, 122°1'N).

MATERIAL EXAMINED. — 24 specimens, 95-192 mm.

Source : MNHN, Paris

New Caledonia. BIOCAL: stn CP 31, 23°7.26'S, 166°50.45'E, 850 m depth, beam trawl, R. V. *"Jean Charcot"*, 29 August 1985: 2 specimens, males 141-157 mm (MNHN 1994-724). — Stn CP 54, 23°10.30'S, 167°42.98'E, 1000 m depth, beam trawl, 1 September 1985: 1 specimen, female 169 mm (MNHN 1994-725). — Stn CP 61, 24°11.67'S, 167°31.37'E, 1070 m depth, beam trawl, 2 September 1985: 2 specimens, female + male, 160+ & 192 mm (ZMUC-P.77851-852). — Stn CP 69, 23°51.38'S,167°58.68'E, 1225 m depth, beam trawl, 3 September 1985: 1 specimen, female 168 mm (MNHN 1994-726). — Stn CP 75, 22°18.65'S, 167°23.30'E, 825 m depth, beam trawl, 4 September 1985: 6 specimens, 4 females + 1 male + ?, 148-164 mm (MNHN 1994-727).

Norfolk Ridge. BERYX 11: stn CP 58, 23°19.2'- 20.3'S, 167°59.4'- 58.4'E (Aztèque seamount), 850-920 m depth, beam trawl, R. V. *"Alis"*, 22 October 1992: 2 specimens, males 158-167 mm (NMNZ-P.29048 and P.29166).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 323, 21°18.52'S, 157°57.62'E, 970 m depth, beam trawl, R. V. *"Coriolis"*, 14 October 1986: 4 specimens, females 95-139 mm (MNHN 1994-728). — Stn CP 324, 21°15.01'S, 157°51.33'E, 970 m depth, beam trawl, 14 October 1986: 6 specimens, 3 females + 3 males, 112+ - 145 mm (MNHN 1994-729).

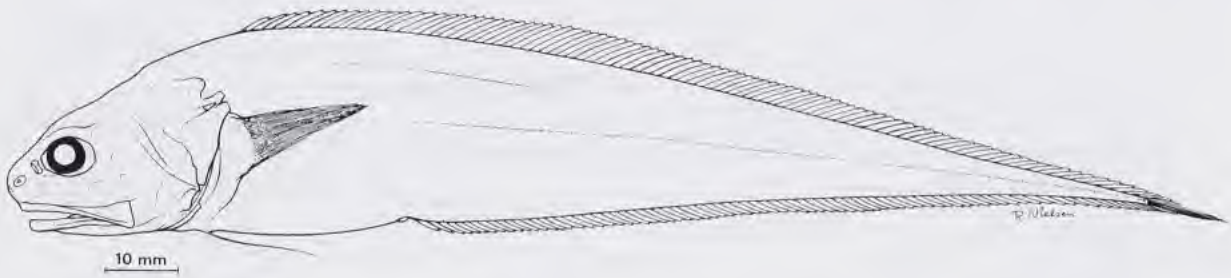

FIG. 10. — *Monomitopus garmani* (Smith & Radcliffe, 1913), male 158 mm (NMNZ-P.29166).

DESCRIPTION. — Number of fin-rays in dorsal 92-96, caudal 7-8, anal 76-82, pectoral 29-32, precaudal vertebrae 12, total vertebrae 57-58, long, slender rakers on anterior gill arch 15-18 (not including the 3-4 relatively long, robust rakers on dorsal branch), pseudobranchial filaments 2, anterior dorsal fin-ray above vertebra no. 5-6, anterior anal fin-ray below dorsal fin-ray no. 16-19 and below vertebra no. 15. Head 20.5-22.5 % and horizontal eye diameter 4.3-5.0 % SL.

REMARKS. — This genus holds 14 nominal species which are mainly separated by meristic characters and length of eye and head. The genus is much in need of a revision.

DISTRIBUTION. — Known from Celebes to New Caledonia at depths between 825 and 1220 m.

Genus ***NEOBYTHITES*** Goode & Bean, 1886

Body short, mouth terminal, strong, straight opercular spine, horizontal diameter of eye window equal to or slightly shorter than length of snout, two rays in each ventral fin, two median basibranchial tooth patches. A more thorough description of the genus is given by NIELSEN (1995).

Neobythites is known from 61 specimens from off New Caledonia representing seven species five of which are new and here described. Since these species will be included in a future paper on the *Neobythites spp.* from the East Indian and Pacific Oceans the following descriptions are relatively short.

Source : MNHN, Paris

KEY TO THE NEW CALEDONIAN SPECIES OF *NEOBYTHITES*

1 Ventral fin-rays reaching beyond anus; dorsal part of body mottled; two ocelli in dorsal fin with the anterior placed at origin of fin ..... ***N. longiventralis*** sp. nov.

1' Ventral fin not reaching anus; body not mottled; 0-2 ocelli in dorsal fin with the anterior placed posterior to anus **2**

2 No spines on hind margin of preoperculum; pectoral rays 33-34; 7-8 long gill rakers..... ***N. bimarginatus***

2' Two spines on hind margin of preoperculum; pectoral fin-rays 25-29; 10-16 long gill rakers **3**

3 Dorsal fin with about four dark blotches or ocelli continuing on body as dark, vertical bars ..... ***N. zonatus*** sp. nov.

3' No dark, vertical bars on body **4**

4 1-2 ocelli on dorsal fin **5**

4' No ocelli on dorsal fin **6**

5 One ocellus on dorsal fin ..... ***N. unimaculatus***

5' Two ocelli on dorsal fin ..... ***N. bimaculatus*** sp. nov.

6 Long rakers on anterior gill arch 14-16; longest gill filaments on anterior arch 2.8-4.8% head length ..... ***N. pallidus*** sp. nov.

6' Long rakers on anterior arch 11; longest gill filaments on anterior arch 6.1-7-6% head length ..... ***N. neocaledoniensis*** sp. nov.

Neobythites bimaculatus sp. nov.

Figs 11a-b

MATERIAL EXAMINED. — 5 specimens, 73-170 mm.

New Caledonia. MUSORSTOM 4: stn CP 241, 22°9'S, 167°12.2'E, 470-480 m depth, beam trawl, R. V. *"Vauban"*, 3 October 1985: holotype, female 128 mm (MNHN 1994-730). — Stn CP 243, 22°2.8'S, 167°7.7'E 435-450 m depth, beam trawl, 3 October 1985: 2 paratypes, females 73-155 mm (MNHN 1994-731) and 1 paratype, female 115 mm (ZMUC-P.771153). — Stn CC 247, 22°9'S, 167°13.3'E, 435-460 m depth, otter trawl, 4 October 1985: 1 paratype, female 170 mm (MNHN 1994-732).

DIAGNOSIS. — *N. bimaculatus* differs from all other *Neobythites* species by the following combination of characters: Number of dorsal fin-rays 100-105, anal 86-92, two spines on hind margin of preoperculum, 10-12 long raker on anterior gill arch, six small pseudobranchial filaments, two ocelli placed on middle third of dorsal fin.

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 1. Holotype (Fig. 11a): Snout rather blunt about as long as horizontal diameter of eye window. Upper jaw ends just posterior to eye. Lateral line indistinct. Teeth granular. Anterior gill arch with three short and two long rakers on dorsal branch, one long raker in angle and ventral branch with eight long and six short rakers. Two distinct ocelli on dorsal fin. Upper part of head and body mottled brown indicating about ten vertical, brown bands. Posteriormost part of dorsal and anal fins and caudal fin dark. Paratypes (only major differences from holotype will be mentioned): The three smallest paratypes have 12-15 more distinct brown, vertical bands on upper part of body. Furthermore, the 73 mm paratype has two less distinct ocelli on anal fin (Fig. 11b).

ETYMOLOGY. — The specific name refers to the two ocelli on the dorsal fin.

DISTRIBUTION. — Known from off New Caledonia between 435 and 480 m of depth.

Source : MNHN, Paris

REMARKS. — *N. bimaculatus* seems most closely related to *N. crosnieri* Nielsen, 1994 with which it shares the two preopercular spines and the two ocelli on the dorsal fin. They differ by the position of the two ocelli which is on the middle third of the dorsal fin in *bimaculatus* while it is on the posterior third in *crosnieri*.

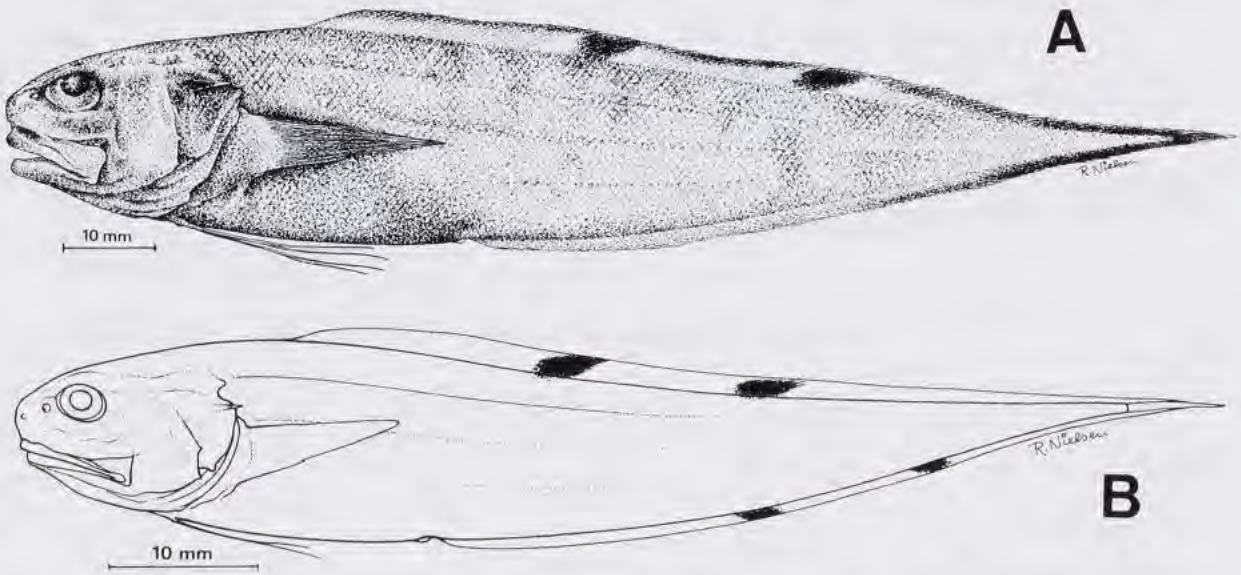

FIG. 11. — *Neobythites bimaculatus* sp. nov. — **A**: holotype, female 128 mm (MNHN 1994-730). — **B**: paratype, female 73 mm (MNHN 1994-731).

Neobythites bimarginatus Fourmanoir & Rivaton, 1979

Fig. 12

Neobythites bimarginatus Fourmanoir & Rivaton, 1979: 416, fig. 9 (type locality: west of Ile des Pins, New Caledonia).

MATERIAL EXAMINED. — 13 specimens, 76-110 mm.

New Caledonia. West of Pins Island: 360 m depth, trawl, 13 April 1978: holotype, male 109 mm (MNHN 1978-472). — Paratype, male 97 mm (MNHN 1978-473), same data as holotype. The holotype and paratype of *N. bimarginatus* are the only ophidioid specimens here treated which were not caught by the expeditions mentioned in the introduction. MUSORSTOM 4: stn CP 213, 22°51.3'S, 167°12'E, 405-530 m depth, beam trawl, R. V. *"Vauban"*, 28 September 1985: 2 specimens, females 89-98 mm (MNHN 1994-733). — Stn CP 214, 22°53.8'S, 167°13.9'E, 425-440 m depth, beam trawl, 28 September 1985: 1 specimen, female 92 mm (MNHN 1994-734).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 311, 22°13.6'S, 159°23.9'E, 320 m depth, beam trawl, R. V. *"Coriolis"*, 12 October 1986: 2 specimens, female and male, 102 and 110 mm (MNHN 1994-735) and 1 specimen, female 76 mm (ZMUC-P.771154) — Stn DW 339, 19°53.4'S, 158°37.9'E, 380-395 m depth, epibenthic dredge, 16 October 1986: 1 specimen, female 77 mm (MNHN 1994-736).

Norlfolk Ridge. CHALCAL 2: stn CP 26, 23°18.15'S, 168°3.58'E, 296 m depth, beam trawl, R. V. *"Coriolis"*, 31 October 1986: 2 specimens, female + ?, 90 and 87 mm (MNHN 1994-737) and 1 specimen, male 85 mm (ZMUC-P.771155).

Loyalty Islands. MUSORSTOM 6: stn DW 478, 21°8.96'S, 167°54.28'E, 400 m depth, epibenthic dredge, R. V. *"Alis"*, 22 February 1989: 1 specimen, female 86 mm (MNHN 1994-738).

Source : MNHN, Paris

DIAGNOSIS. — *N. bimarginatus* differs from all other *Neobythites* species by having 33-34 pectoral fin-rays, anterior anal fin-ray below dorsal fin-ray no. 23-25, distal and proximal parts of dorsal and anal fins light and middle part black, and median part of body immediately behind head with 6-7 light areas.

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 2. Holotype (Fig. 12): Snout blunt, longer than horizontal diameter of eye window. Upper jaw ends below posterior margin of eye. Lateral line distinct and dark. Teeth granular. Anterior gill arch with four short rakers on dorsal branch, one long raker in angle and ventral branch with eight long and three short rakers. See diagnosis for coloration. Variation: The paratype and 11 additional specimens vary little from the holotype.

TABLE 1. — Meristic and morphometric characters of *Neobythites bimaculatus* sp. nov.

	Holotype MNHN 1994-730	Paratype MNHN 1994-732	Paratype MNHN 1994-731	Paratype ZMUC P 771153	Paratype MNHN 1994-731
Standard length	128 mm	170 mm	155 mm	115 mm	73 mm
MERISTIC CHARACTERS					
Dorsal fin	100	105	105	105	105
Caudal fin	8	8	8	8	8
Anal fin	86	88	89	92	89
Pectoral fin	27	27	27	28	27
Pseudobranchial filaments	6	6	6	6	-
Precaudal vertebrae	13	13	13	13	13
Total vertebrae	61	62	62	62	61
Developed rakers on anterior gill arch	11	11	12	11	10
Anterior dorsal ray above vertebra n°	5	5	6	5	5
Anterior anal ray below dorsal ray n°	18	19	19	19	19
Anterior anal ray below vertebra n°	15	15	15	15	15
MORPHOMETRIC CHARACTERS					
In % of SL					
Head length	22.5	22.0	22.0	21.0	21.0
Depth at anus	16.5	17.0	16.0	14.5	15.0
Upper jaw	11.0	11.0	10.5	10.5	10.5
Horizontal eye window	4.8	4.5	4.7	4.2	4.9
Preanal	40.0	42.0	41.0	38.0	38.5
Predorsal	25.0	24.5	24.5	23.5	24.0
Length of ventral fin	16.0	15.5	15.0	15.0	13.0
Snout to 1st ocellus	48.5	48.5	47.5	44.5	45.0
Snout to 2nd ocellus	66	68	68	61	63
In % of head-length					
Longest gill filaments on anterior arch	6.0	6.4	5.9	6.7	6.5

BIOLOGY. — *N. bimarginatus* occurs on the upper part of the continental shelf (296-530 m). The presence of gastropods in several specimens shows that it feeds on the bottom. It seems to be a small species as it has well developed gonads at a standard length of about 100 mm and specimens exceeding 110 mm are not known.

Source : MNHN, Paris

DISTRIBUTION. — *N. bimarginatus* is kown from off New Caledonia and a few neighbouring islands, caught in bottom fishing gear.

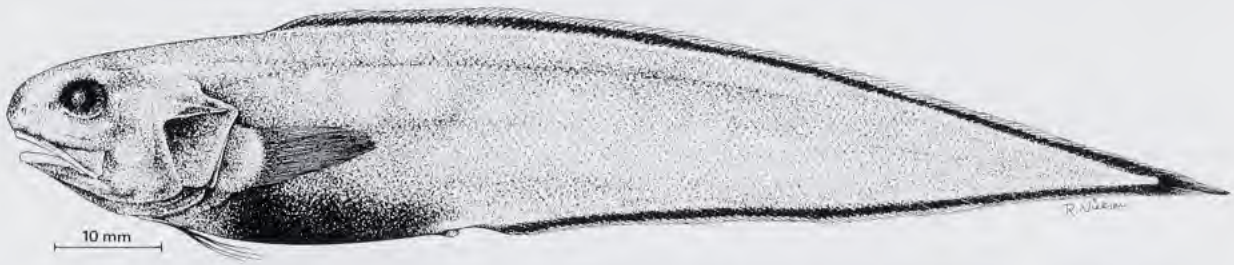

FIG. 12. — *Neobythites bimarginatus* Fourmanoir & Rivaton, 1979, holotype, male 109 mm (MNHN 1978-472).

TABLE 2. — Meristic and morphometric characters of *Neobythites bimarginatus* Fourmanoir & Rivaton, 1979.

	Holotype MNHN 1978-472	Paratype MNHN 1978-473	13 specimens including Holotype + Paratype		
Standard length	109 mm	97 mm	76-110 mm		
MERISTIC CHARACTERS			Minimum	(Mean)	Maximum
Dorsal fin	107	107	106	(**107.8**)	110
Caudal fin	8	8		(**8.0**)	
Anal fin	86	87	86	(**87.5**)	90
Pectoral fin	33	33	32	(**32.9**)	34
Pseudobranchial filaments	2	2		(**2.0**)	
Precaudal vertebrae	13	14	13	(**13.9**)	14
Total vertebrae	59	61	59	(**60.5**)	62
Developed rakers on anterior gill arch	9	8	6	(**8.0**)	9
Anterior dorsal ray above vertebra n°	4	4	3	(**3.4**)	4
Anterior anal ray below dorsal ray n°	25	24	23	(**23.8**)	25
Anterior anal ray below vertebra n°	14	16	15	(**15.5**)	16
MORPHOMETRIC CHARACTERS					
In % of SL					
Head length	19.5	20.5	19.0	(**19.9**)	21.0
Depth at anus	16.0	15.5	14.5	(**15.7**)	17.5
Upper jaw	8.9	9.7	8.9	(**9.4**)	10.5
Horizontal eye window	4.0	4.6	4.0	(**4.8**)	5.3
Preanal	39.5	41.5	37.5	(**40.0**)	43.5
Predorsal	20.5	22.5	19.0	(**21.7**)	23.5
In % of head-lengt					
Longest gill filaments on anterior arch	6.5	5.5	4.9	(**5.5**)	6.3

Source : MNHN, Paris

Neobythites longiventralis sp. nov.

Fig. 13

MATERIAL EXAMINED. — 2 specimens, 108-137 mm.

New Caledonia. MUSORSTOM 4: stn CP 192, 18°59.3'S, 163°25'E, 320 m depth, beam trawl, R. V. *"Vauban"*, 19 September 1985: holotype, female 137 mm (MNHN 1994-739). — Stn CP 172, 19°1.2'S, 163°16'E, 275-330 m depth, beam trawl, 17 September 1985: paratype, male 108 mm (MNHN 1994-740).

DIAGNOSIS. —*N. longiventralis* differs from all other species of *Neobythites* by the following combination of characters: Ventral fins reach beyond origin of anal fin, hind margin of preoperculum with two spines, number of vertebrae 53-54, 11 long rakers on anterior gill arch, and anterior ocellus placed at origin of dorsal fin with the second and larger ocellus placed posterior to anus.

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 3. Holotype (Fig. 13): Snout rather blunt, a little longer than horizontal diameter of eye window. Upper jaw ends well behind posterior margin of eye. Lateral line light. Teeth granular. Vomer subtriangular. Anterior gill arch with 4-5 short and two long rakers on dorsal branch, one long raker in angle and ventral branch with eight long and five extreemly short rakers. Dorsal part of head and body mottled brown; ventral part more uniformly brown. Dorsal fin with irregular dark areas besides two ocelli; lips dark. Paratype: The only major variation from the holotype is that the two ocelli are almost equal in size.

BIOLOGY. — Gastropods were found in the intestine of the holotype.

ETYMOLOGY. — The specific name refers to the long ventral fin-rays.

DISTRIBUTION. — Known from two New Caledonian localities trawled at 275-330 m of depth.

REMARKS. — Two additional species of *Neobythites* have ventral fins ending posterior to anus. Of these *N. longipes* Smith & Radcliffe *in* Radcliffe, 1913 from the Philippines can be distinguished by having one ocellus in dorsal fin and one weak preopercular spine only, and *N. stelliferoides* Gilbert, 1890 from the East Pacific has neither ocelli nor preopercular spines.

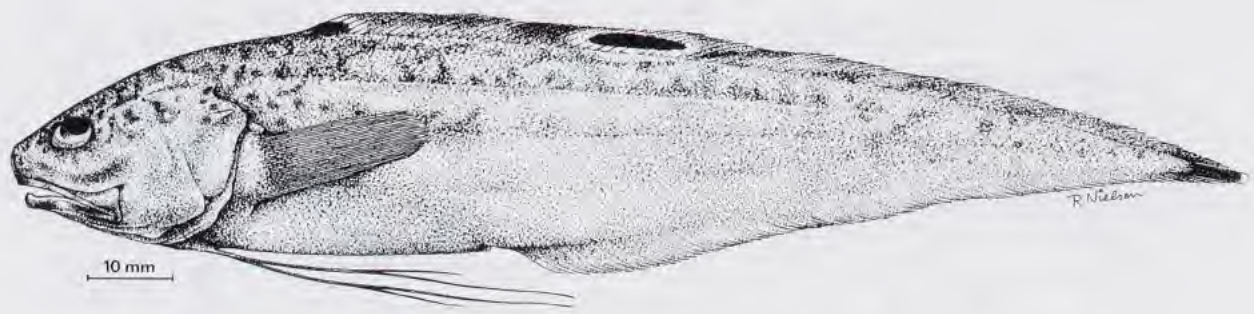

FIG. 13. — *Neobythites longiventralis* sp. nov., holotype, female 137 mm (MNHN 1994-739).

Source : MNHN, Paris

TABLE 3. — Meristic and morphometric characters of *Neobythites longiventralis* sp. nov.

	Holotype MNHN 1994-739	Paratype MNHN 1994-740
Standard length	137 mm	108 mm
MERISTIC CHARACTERS		
Dorsal fin	91	92
Caudal fin	8	8
Anal fin	76	76
Pectoral fin	26	25
Pseudobranchial filaments	4-5	5-5
Precaudal vertebrae	13	13
Total vertebrae	54	53
Developed rakers on anterior gill arch	11	11
Anterior dorsal ray above vertebra n°	5	5
Anterior anal ray below dorsal ray n°	20	20
Anterior anal ray below vertebra n°	15	15
MORPHOMETRIC CHARACTERS		
In % of SL		
Head length	23.0	22.0
Depth at anus	18.5	15.5
Upper jaw	12.5	11.5
Horizontal eye window	4.7	5.1
Preventral	18.5	18.0
Preanal	43.0	42.0
Predorsal	26.5	26.0
Length of ventral fin	32.0	27.5
Snout to 1st ocellus	28.5	27.5
Snout to 2nd ocellus	50.0	47.0
In % of head-length		
Longest gill filaments on anterior arch	7.9	8.3

Neobythites neocaledoniensis sp. nov.

Fig. 14

MATERIAL EXAMINED. — 8 specimens, 124-245 mm.

New Caledonia. MUSORSTOM 4: stn CP 194, 18°52.8'S, 163°21.7'E, 550 m depth, beam trawl, R. V. *"Vauban"*, 19 September 1985: holotype, female 169 mm (MNHN 1994-741). — 2 paratypes, female and male, 195 and 245 mm (MNHN 1994-742) and 1 paratype, female 145 mm (ZMUC-P.771156), same data as holotype. — Stn CP 195, 18°54.8'S, 163°22.2'E, 470 m depth, beam trawl, 19 September 1985: 1 paratype, female 124 mm (MNHN 1994-743). — Stn CC 201, 18°55.80'S, 163°13.80'E, 500 m depth, otter trawl, 20 September 1985: 1 paratype, male 162 mm (MNHN 1994-744).

Norfolk Ridge. BERYX 11: stn CP 7, 24°54.8'S, 168°21.3'E (Seamount "B"), 540-670 m depth, beam trawl, R. V. *"Alis"*, 15 October 1992: 2 paratypes, females 125-132 mm (NMNZ-P.29201).

Source : MNHN, Paris

DIAGNOSIS. — *N. neocaledoniensis* differs from all other *Neobythites* species by the following combination of characters: Number of dorsal fin-rays 102-106, anal 87-90, two spines on hind margin of preoperculum, 11 long rakers on anterior gill arch, no ocelli or spots on fins or bands on body.

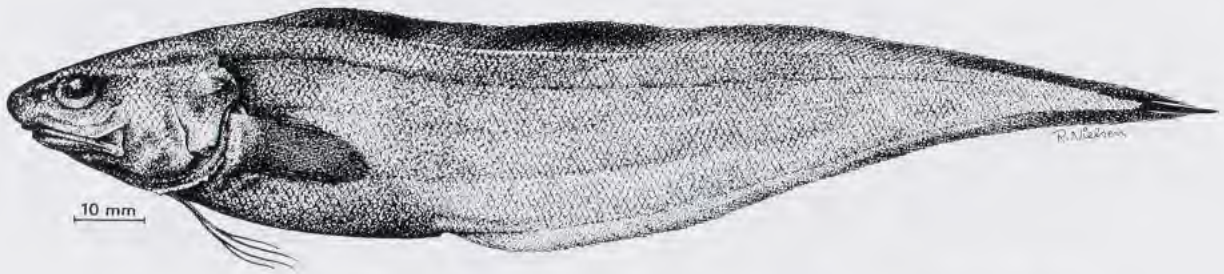

FIG. 14. — *Neobythites neocaledoniensis* sp. nov., holotype, female 169 mm (MNHN 1994-741).

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 4. Holotype (Fig. 14): Snout pointed, longer than horizontal diameter of eye window. Upper jaw ends well behind eye. Lateral line distinct. Teeth granular. Vomer subtriangular. Anterior gill arch with three short and two long rakers on dorsal branch, one long raker in angle and ventral branch with eight long and three short rakers. Body and head brown, darker above than below and no ocelli or spots. Paratypes: All paratypes are very similar to the holotype except for a 245 mm specimen (MNHN 1994-742) in which there are two faint black spots on dorsal fin and seven (vs 3-4) pseudobranchial filaments much smaller than in the other paratypes.

BIOLOGY. — Various gastropods and remains of crustaceans were found in the intestine of most specimens.

ETYMOLOGY. — The specific name refers to the type locality.

DISTRIBUTION. — Caught on three localities off New Caledonia and once a little further south on the Norfolk Ridge at depths between 470 and 670 m.

REMARKS. — *N. neocaledoniensis* differs from all other *Neobythites* species with two preopercular spines and no ocelli or vertical bars on body by having more rays in dorsal and anal fins (vs. *N. purus* Smith & Radcliffe in Radcliffe, 1913 and *N. sivicola* (Jordan & Snyder, 1901)) and by having fewer long rakers on anterior gill arch and more coloration (vs. *N. pallidus*, see below).

Neobythites pallidus sp. nov.

Fig. 15a-b

MATERIAL EXAMINED. — 17 specimens, 102-143 mm.

New Caledonia. MUSORSTOM 4: stn CP 198, 18°49.4'S, 163°18.8'E, 590 m depth, beam trawl, R. V. *"Vauban"*, 20 September 1985: holotype, male 135 mm (MNHN 1994-745). — Stn. CP 158, 18°49.3'S, 163°15'E, 620 m depth, beam trawl, 15 September 1985: 1 paratype, female 123 mm (MNHN 1994-746). — 2 paratypes, females 116-132 mm (MNHN 1994-747) and 1 paratype, female 121 mm (ZMUC-P.771157), same data as holotype. — Stn CP 199, 18°50'S, 163°14.5'E, 600 m depth, beam trawl, 20 September 1985: 1 paratype, female 143 mm (MNHN 1994-748). — Stn CP 242, 22°5.8'S, 167°10.3'E, 500-550 m depth, beam trawl, 3 October 1985: 10 paratypes, 9 females and 1 male, 102-137 mm (MNHN 1994-749) and 1 paratype, male 132 mm (ZMUC-P.771158).

Source : MNHN, Paris

TABLE 4. — Meristic and morphometric characters of *Neobythites neocaledoniensis* sp. nov.

	Holotype MNHN 1994-741	Holotype + 7 paratypes
Standard length	169 mm	124-245 mm
MERISTIC CHARACTERS		Minimum-Maximum
Dorsal fin	106	102-106
Caudal fin	8	8
Anal fin	89	87-90
Pectoral fin	28	24-28
Pseudobranchial filaments	4	3-4 (7)
Precaudal vertebrae	13	13
Total vertebrae	59	59-61
Developed rakers on anterior gill arch	11	11
Anterior dorsal ray above vertebra n°	5	5-6
Anterior anal ray below dorsal ray n°	20	18-22
Anterior anal ray below vertebra n°	15	14-16
MORPHOMETRIC CHARACTERS		
In % of SL		
Head length	25.0	22.5-25.0
Depth at anus	17.0	16.0-18.0
Upper jaw	12.5	11.5-12.5
Horizontal eye window	4.7	4.1-4.7
Preanal	42.5	39.5-47.0
Predorsal 26.5	25.0-26.5	
In % of head-length		
Longest gill filaments on anterior arch	7.6	5.8-7.6

DIAGNOSIS. — *N. pallidus* differs from all other *Neobythites* species by the following combination of characters : Number of dorsal fin-rays 97-101, anal 82-86, two spines on hind margin of preoperculum, 14-16 long rakers on anterior gill arch, 4-6 pseudobranchial filaments, longest gill filaments on anterior arch 2.8-4.8 % head length, no ocelli, dark blotches or vertical bands on body.

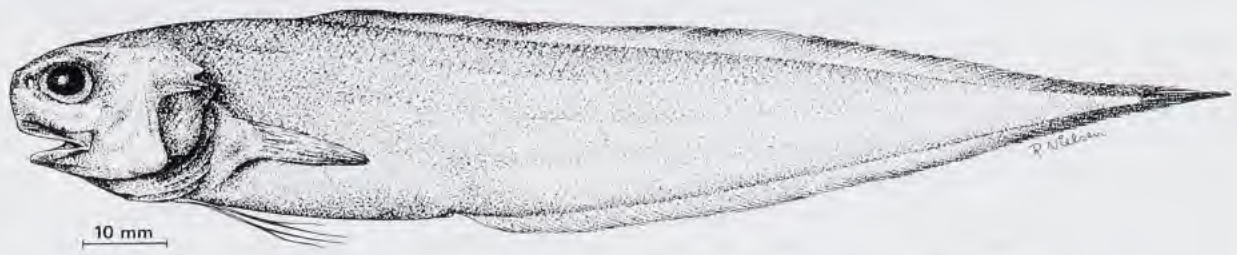

FIG. 15a. — *Neobythites pallidus* sp. nov., holotype, male 135 mm (MNHN 1994-745).

Source : MNHN, Paris

TABLE 5. — Meristic and morphometric characters of *Neobythites pallidus* sp. nov.

	Holotype MNHN 1994-745	Holotype and 16 paratypes			
Standard length	135 mm	102-143 mm			
MERISTIC CHARACTERS		Minimum	(Mean)	Maximum	(N)
Dorsal fin	100	97	(**100.0**)	101	(17)
Anal fin	85	82	(**84.9**)	86	(16)
Pectoral fin	28	26	(**27.7**)	29	(12)
Pseudobr. filaments	4	4	(**4.5**)	6	(16)
Precaudal vertebrae	13		**13**		(17)
Total vertebrae	59	58	(**58.9**)	60	(16)
Developed rakers on anterior gill arch	15	14	(**15.0**)	16	(16)
Anterior dorsal ray above vertebra n°	5	5	(**5.9**)	6	(17)
Anterior anal ray below dorsal ray n°	19	18	(**19.2**)	20	(17)
Anterior anal ray below vertebra n°	15	15	(**15.1**)	16	(17)
MORPHOMETRIC CHARACTERS					
In % of SL					
Head length	20.5	20.5	(**21.4**)	22.5	(17)
Depth at anus	14.5	14.0	(**15.3**)	16.5	(17)
Upper jaw	9.3	9.3	(**10.3**)	11.0	(17)
Horizontal eye window	5.0	4.3	(**4.9**)	5.5	(15)
Preanal	38.5	38.0	(**39.3**)	42.5	(17)
Predorsal	24.0	23.0	(**24.8**)	26.5	(17)
In % of head-length					
Longest gill filaments on anterior arch	3.2	2.8	(**3.6**)	4.8	(17)

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 5. Holotype (Fig. 15a): Snout blunt, shorter than horizontal diameter of eye window. Upper jaw ends below posterior margin of eye. Lateral line indistinct. Teeth granular. Vomer triangular. Anterior gill arch with two short and four long rakers on dorsal branch, one long raker in angle and ventral branch with ten long and four short rakers. Except for a concentration of brown pigment on snout and black pigment around anus, head and body are uniformly light brown. Paratypes: The 16 paratypes vary but slightly from the holotype; some specimens with a pointed snout (Fig. 15b) and others with pigmented lips.

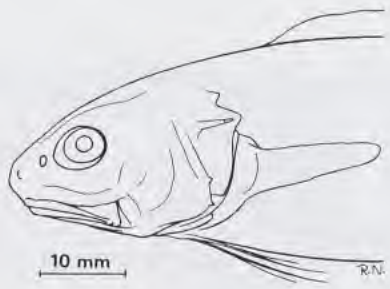

FIG. 15b. — *Neobythites pallidus* sp. nov.: paratype, female 121 mm (ZMUC-P.771157).

Source : MNHN, Paris

BIOLOGY. — A few specimens with gastropods in the intestine.

ETYMOLOGY. — The specific name refers to the pale body.

DISTRIBUTION. — Caught on four localities off New Caledonia at depths between 500 and 620 m.

REMARKS. — *N. pallidus* differs from all other *Neobythites* species with two preopercular spines and lack of distinct pigmentation, such as *N. neocaledoniensis, N. purus* and *N. sivicola*, by having 14-16 long rakers on anterior gill arch (cf. Remarks under *N. neocaledoniensis*.).

Neobythites unimaculatus Smith & Radcliffe, 1913
Fig. 16

Neobythites unimaculatus Smith & Radcliffe *in* Radcliffe, 1913: 140, pl. 7, fig. 2 (type locality: 4°10'50''N, 118°39'35''E).
Neobythites nigromaculatus Kamohara, 1938: 67, fig. 37 (type locality: Mimase market, Japan).

Neobythites steatiticus: BEAUFORT & CHAPMAN, 1951: 417 (in part).

MATERIAL EXAMINED. — 3 specimens, 102-149+ mm.
New Caledonia. BIOCAL: stn CP 105, 21°30.71'S, 166°21.72'E, 335 m depth, beam trawl, R. V. *"Jean Charcot"*, 8 September 1985: 2 specimens, female and male, 149+ and 115 mm (MNHN 1994-750). — Stn CP 108, 22°2.55'S, 167°5.68'E, 335 m depth, beam trawl, 9 September 1985: 1 specimen, female 102 mm (MNHN 1994-751).

DIAGNOSIS. — *N. unimaculatus* differs from all other *Neobythites* species by the following combination of characters: Distinct ocellus on dorsal fin situated immediately behind vertical line through anus, two sharp spines on posterior margin of preoperculum, ventral fins reaching halfway to anus and no vertical bars on body.

DESCRIPTION. — Number of fin-rays in dorsal 90-92, caudal 8, anal 74-75, pectoral 28-29, precaudal vertebrae 13, total vertebrae 53-54, long rakers on anterior gill arch 10, pseudobranchial filaments 4-6, anterior dorsal fin-ray above vertebra no. 5-6, anterior anal fin-ray below dorsal fin-ray no. 20 and vertebra no. 15-16. Pre-ocellus length 45-46 % standard length.

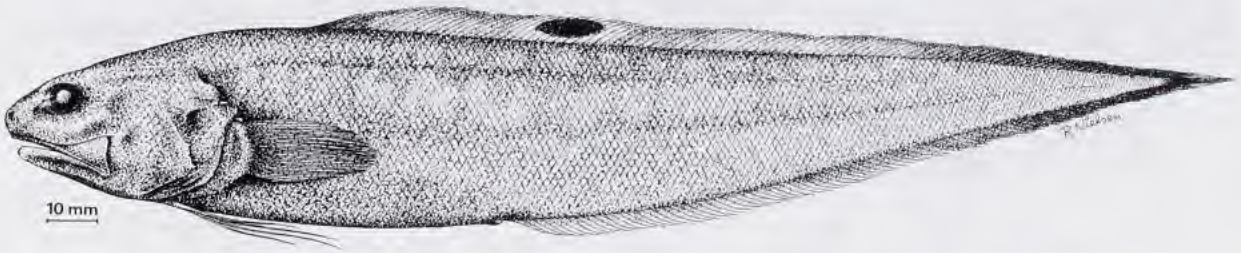

FIG. 16. — *Neobythites unimaculatus* Smith & Radcliffe, 1913, female 218 mm (BSKU 44500).

REMARKS. — The apparent main differences between *N. nigromaculatus* and *N. unimaculatus*, the number of dorsal fin-rays and lateral line scales, are caused by incorrect data in the original description of *N. unimaculatus*. Examination of the holotype gave meristic characters like those of *N. nigromaculatus*. The specimen here illustrated was caught in Japanese waters and is kept in Kyoto University (BSKU).

Source : MNHN, Paris

DISTRIBUTION. — Caught off New Caledonia at 335 m of depth. Elsewhere known from Japan to the Philippines and from the Arafura Sea at depths between 111 and 567 m.

Neobythites zonatus sp. nov.

Fig. 17

MATERIAL EXAMINED. — 13 specimens, 79-174 mm.

Norfolk Ridge. CHALCAL 2: stn CC 2, 24°55.48'S, 168°21.29'E, 500-610 m depth, otter trawl, R. V. *"Coriolis"*, 28 October 1986: holotype, female 139 mm (MNHN 1994-752). — Stn CP 21, 24°54'S, 168°21.61'E, 500 m depth, beam trawl, 28 October 1986: 1 paratype, male 105+ mm (MNHN 1994-755). — Stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m depth, otter trawl, 28 October 1986: 2 paratypes, female + ?, 105+? and 79 mm (MNHN 1994-756).

SMIB 4: stn DW 39, 24°56.2'S, 168°21.5'E, 560 m depth, epibenthic dredge, R. V. *"Alis"*, 7 March 1989: 1 paratype, female 108 mm (MNHN 1994-758).

BERYX 11: stn CP 7, 24°54.8'S, 168°21.3'E (Seamount "B"), 540-670 m depth, beam trawl, R. V. *"Alis"*, 15 October 1992: 1 paratype, female 118 mm (NMNZ-P.29200) and 1 paratype, female 114 mm (ZMUC-P.771160). — Stn 22, 24°44.4'S, 168°6.6'E (Kaiyo Maru Seamount), 490-510 m depth, beam trawl, 17 October 1992: 1 paratype, male 141 mm (NMNZ-P.29019). — Stn 53, 23°48.3'S, 168°17.1'E (Jumeaux Seamount), 540-950 m depth, beam trawl, 21 October 1992: 1 paratype, male 134 mm (NMNZ-P.29329).

New Caledonia. MUSORSTOM 4: stn CP 238, 22°13'S, 167°14'E, 500-510 m depth, beam trawl, R. V. *"Vauban"*, 2 October 1985: 1 paratype, female 160 mm (MNHN 1994-753).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn DC 380, 19°37.7'S, 158°43.9'E, 555-570 m depth, Charcot dredge, R. V. *"Coriolis"*, 21 October 1986: 1 paratype, female 174 mm (MNHN 1994-754).

Loyalty Islands. MUSORSTOM 6: stn CP 467, 21°5.13'S, 167°32.11'E, 575 m depth, beam trawl, R. V. *"Alis"*, 21 February 1989: 1 paratype, 100 mm (MNHN 1994-757) and 1 paratype, female 128 mm (ZMUC-P.771159).

DIAGNOSIS. — *N. zonatus* differs from all other *Neobythites* species by the following combination of characters: Number of dorsal fin-rays 100-105, anal 85-91, two spines on hind margin of preoperculum, 11-13 long rakers on anterior gill arch, 3-4 pseudobranchial filaments, dorsal fin with 4-5 more or less distinct dark blotches continuing into dark, vertical bars on body, posterior part of dorsal and anal fin and caudal fin dark.

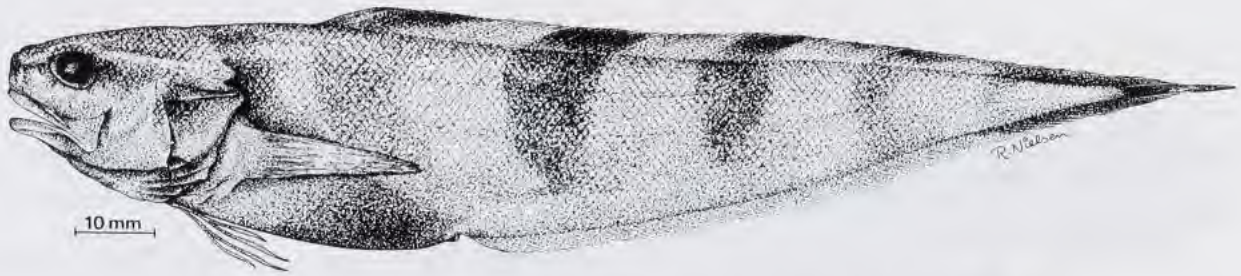

FIG. 17. — *Neobythites zonatus* sp. nov., holotype, female 139 mm (MNHN 1994-752).

DESCRIPTION. — The main meristic and morphometric characters are shown in Table 6. Holotype (Fig. 17): Snout blunt, as long as horizontal diameter of eye window. Upper jaw ends posterior to eye. Lateral line indistinct. Teeth granular. Vomer triangular with rather large teeth. Anterior gill arch with three short and three long rakers on dorsal branch, one long raker in angle and ventral branch with eight long and five short rakers. Six more or less distinct, dark-brown vertical bars on body of which four middle ones end in a dark blotch on dorsal fin, snout

Source : MNHN, Paris

darker brown with line through eyes. Paratypes: The main difference from the holotype is found in the coloration as there are specimens with up to nine diffuse vertical bars on body and five dark blotches on dorsal fin.

BIOLOGY. — Gastropods are found in the intestine of several specimens.

ETYMOLOGY. — The specific name refers to the dark, vertical bars or zones on body.

DISTRIBUTION. —Known from off New Caledonia and a few neighbouring islands at depths between 490 and 950 m.

REMARKS. — *N. zonatus* seems most closely related to *N. fasciatus* Smith & Radcliffe *in* Radcliffe, 1913 and *N. multistriatus* Nielsen & Quéro, 1991 with which it shares two spines on preoperculum and several dark, vertical bars on body. However, in contrast to *N. zonatus* in both the other species the bars continue as dark blotches on anal fin.

TABLE 6. — Meristic and morphometric characters of *Neobythites zonatus* sp. nov.

	Holotype	Holotype and 12 paratypes			
Standard length	139 mm	79 -174 mm			
MERISTIC CHARACTERS		Minimum	(Mean)	Maximum	(N)
Dorsal fin	103	100	(**102.8**)	105	(11)
Caudal fin	8		(**8.0**)		
Anal fin	89	85	(**88.9**)	91	(11)
Pectoral fin	27	27	(**27.4**)	28	(11)
Pseudobranchial filaments	4/3	3	(**4.1**)	5	(12)
Precaudal vertebrae	13	12	(**12.9**)	13	(12)
Total vertebrae	60	59	(**60.2**)	62	(13)
Developed rakers on anterior gill arch	12	11	(**12.2**)	13	(13)
Anterior dorsal ray above vertebra n°	5	5	(**5.3**)	6	(13)
Anterior anal ray below dorsal ray n°	19	18	(**19.0**)	20	(12)
Anterior anal ray below vertebra n°	15	14	(**15.3**)	17	(12)
MORPHOMETRIC CHARACTERS					
In % of SL					
Head length	22.5	21.0	(**22.3**)	23.5	(11)
Depth at anus	16.0	14.5	(**16.1**)	17.0	(11)
Upper jaw	11.5	9.9	(**10.7**)	11.5	(11)
Horizontal eye window	4.5	4.3	(**4.5**)	4.8	(11)
Preanal	41.0	37.0	(**40.1**)	45.0	(11)
Predorsal 26.0	23.0	(**25.2**)		26.0	(11)
Length of ventral fin	12.5	12.0	(**14.0**)	15.5	
Snout-1st dorsal spot	28.0	28.0	(**31.2**)	34.5	
Snout-2nd dorsal spot	44.0	43.5	(**45.2**)	48.5	
Snout-3rd dorsal spot	61.0	57.5	(**61.8**)	67.5	
Snout-4th dorsal spot	74.5	71.5	(**76.1**)	80.0	
In % of head-length					
Longest gill filaments on anterior arch	5.5	3.8	(**5.0**)	7.1	(13)

Source : MNHN, Paris

Genus *OPHIDION* Linnaeus, 1758

Elongate body with elliptical scales arranged at oblique angles to each other, scales absent on head. Basis of ventral fins below orbit. About 150 dorsal fin-rays. Snout spine absent or weakly developed.

Ophidion muraenolepis (Günther, 1880)

Fig. 18

Ophidium muraenolepis Günther, 1880: 46, pl. XX (type locality: Kei Islands).

MATERIAL EXAMINED. — **Chesterfield and Bellona Plateaus**. MUSORSTOM 5: stn CP 311, 22°13.60'S, 159°23.90'E, 320 m depth, beam trawl, R. V. *"Coriolis"*, 12 October 1986: 1 specimen, female 117 mm (MNHN 1994-759).

DESCRIPTION. — Number of fin-rays in dorsal 151, caudal 10, anal 111, pectoral 23, ventral 2, vertebrae 18 + 52, long rakers on anterior gill arch 4, anterior dorsal fin-ray above vertebra no. 8, anterior anal fin-ray below dorsal fin-ray no. 35 and vertebra no. 20. An almost hidden spine on operculum.

BIOLOGY. — A large foraminifera overgrown by a colony of bryozoans was found in the intestine.

DISTRIBUTION. — Known from Indo-Australian waters at depths about 300 m.

REMARKS. — The genus *Ophidion* is under a much needed revision by C. R. ROBINS, USA. Three species have been briefly described from the western Pacific and Indo-Australian areas: *O. asiro* (Jordan & Fowler, 1902), *O. genyopus* Ogilby, 1897 and *O. muraenolepis* (Günther, 1880). The present material seems closest to the latter.

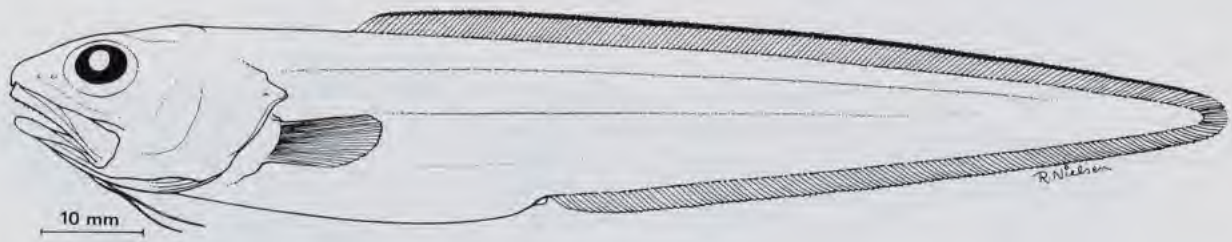

FIG. 18. — *Ophidion muraenolepis* (Günther, 1880), female 117 mm (MNHN 1994-759).

Genus *POROGADUS* Goode & Bean, 1886

Body long and slender, depth at anus at least 10 times in standard length, prominent mucous cavities below eyes, normally two rays in each ventral fin, 5-6 caudal fin-rays.

Source : MNHN, Paris

Porogadus melampeplus (Alcock, 1896)

Fig. 19

Dermatorus melampeplus Alcock, 1896: 305 (type locality: Laccadive Sea).

Porogadus melampeplus: SHCHERBACHEV, 1980: 168.

MATERIAL EXAMINED. — 6 specimens, 112-210 mm.

New Caledonia. BIOCAL: stn CP 5, 21°16.49'S, 166°43.56'E, 2340 m depth, beam trawl, R. V. *"Jean Charcot"*, 11 August 1985: 1 specimen, male 208 mm (ZMUC-P.77845). — Stn CP 27, 22°5.52'S, 166°26.41'E, 1850 m depth, beam trawl, 28 August 1985: 4 specimens, 1 male + 3?, 165-110+ mm (MNHN 1994-760).

BIOGEOCAL: stn CP 273, 21°1.53'S, 166°57.41'E, 1920-2040 m depth, beam trawl, R. V. *"Coriolis"*, 20 April 1987: 1 specimen, female 210 mm (MNHN 1994-761).

DESCRIPTION. — Spines on head moderately long, number of fin-rays in dorsal c. 160, caudal 5, anal c. 140, pectoral 16, ventral 2, vertebrae 15 + 109, 18-22 long rakers on anterior gill arch, 1-2 small pseudobranchial filaments, anterior dorsal fin-ray above vertebra no. 6, anterior anal fin-ray below dorsal fin-ray no. 20 and vertebra no. 17.

DISTRIBUTION. — Known from east of Madagascar to New Caledonia at depths between 1500 and 2400 m.

FIG. 19. — *Porogadus melampeplus* (Alcock, 1896), male 208 mm (ZMUC-P.77845).

REMARKS. — NYBELIN (1957: 288) and SHCHERBACHEV (1980: 164) divided the 14 species of *Porogadus* into three groups according to the development of the head spines. The present material belongs to the group with moderately developed spines holding the following species: *P. subarmatus* Vaillant, 1888, *P. melampeplus* (Alcock, 1896) and *P. guentheri* Jordan & Fowler, 1902. It seems as if the present specimens fit best into the description of *P. melampeplus*. Until a revision of the genus has taken place a specific identification of *Porogadus* specimens is rather uncertain.

Genus ***PYCNOCRASPEDUM*** Alcock, 1889

Relatively short body, 2-3 spines on preopercular angle, opercular spine well-developed, four long rakers on anterior gill arch, two ventral fin-rays, two median basibranchial tooth patches (additionally is found in some specimens a pair or only one unsymmetrically placed tooth patch).

Source : MNHN, Paris

Pycnocraspedum squamipinne Alcock, 1889

Fig. 20

Pycnocraspedum squamipinne Alcock, 1889: 386 (type locality: 20°17.5'N, 88°50'E).

Pycnocraspedum squamipinne: MACHIDA, 1984: 249.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn CP 109, 22°10.03'S, 167°15.22'E, 495 m depth, beam trawl, R. V. *"Jean Charcot"*, 9 September 1985: 1 specimen, 100 mm (MNHN 1994-762).

DESCRIPTION. — Number of fin-rays in dorsal 98, caudal 10, anal 72, pectoral 27, ventral 2, vertebrae 12 + 42, long rakers on anterior gill arch 4, pseudobranchial filaments 7, origin of dorsal fin in front of 1st vertebra, anterior anal fin-ray below dorsal fin-ray no. 27 and vertebra no. 14, sagittal otolith large. Two median basibranchial tooth patches.

FIG. 20. — *Pycnocraspedum squamipinne* Alcock, 1889, 100 mm (MNHN 1994-762).

REMARKS. — The genus is in need of a revision. MACHIDA (1984: 247) discussed the four nominal species in connection with describing a fifth species, *P. fulvum*. He stated that his new species resembled *P. squamipinne* but differed from it by having pseudobranchial filaments, a longer snout, larger body depth, and fewer rays in dorsal and anal fins. Examination of one of Alcock's syntypes showed that *P. squamipinne* does have one pseudobranchial filament and specimens on loan here in Copenhagen show that the relative length of the snout varies with the length of the fish as does the body depth. Five *Pycnocraspedum* specimens from the western Indian Ocean all had four pseudobranchial filaments like *P. fulvum* and 88-92 dorsal and 68-71 anal fin-rays while *P. fulvum* 81 and 63 rays respectively. This indicates either that there is an undescribed species in the western Indian Ocean or that *P. squamipinne* has up to four pseudobranchial filaments. It also shows that *P. fulvum* and *P. squamipinne* are closely related. The present specimen does not fit properly with any of the Indo-Pacific species but seems closest to *P. squamipinne*.

DISTRIBUTION. — Known in a few specimens from off East Africa to New Caledonia at depths between 200 and 500 m.

Genus ***TAUREDOPHIDIUM*** Alcock, 1890

A monotypic genus. See description below.

Source : MNHN, Paris

Tauredophidium hextii Alcock, 1890

Fig. 21

Tauredophidium hextii Alcock, 1890: 213, pl. VIII (type locality: Bay of Bengal).

Tauredophidium hextii: SHCHERBACHEV, 1980: 111.

MATERIAL EXAMINED. — 2 specimens, 77-81 mm.

New Caledonia. BIOCAL: stn CP 58, 23°56.52'S, 166°40.55'E, 2660 m depth, beam trawl, R. V. *"Jean Charcot"*, 1 September 1985: 1 specimen, female 81 mm (MNHN 1994-763).

BIOGEOCAL: stn CP 273, 21°1.53'S, 166°57.41'E, 1920-2040 m depth, beam trawl, R. V. *"Coriolis"*, 20 April 1987: 1 specimen, male 77 mm (MNHN 1994-764).

DESCRIPTION. — Robust head and tapering body, opercular spine very long, preoperculum with three strong spines, eyes not visible, ventral fins widely separated, one median and a pair of basibranchial tooth patches. Number of dorsal fin-rays 72-75, caudal 7-8, anal 64-65, pectoral 18-20, ventral 2, vertebrae 11 + 44-46, long rakers on anterior gill arch 11-12, pseudobranchial filaments 2, anterior dorsal fin-ray above vertebra no. 4-5, anterior anal fin-ray below dorsal fin-ray no. 13-14, and vertebra no. 13-14.

DISTRIBUTION. — Known from off East Africa to New Caledonia at depths between c. 1500 and 2660 m.

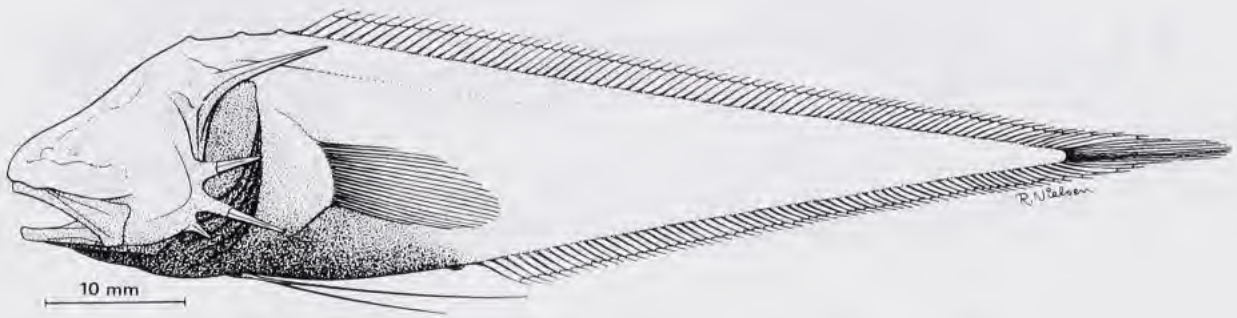

FIG. 21. — *Tauredophidium hextii* Alcock, 1890, male 77 mm (MNHN 1994-764).

Family **APHYONIDAE**

Vertical fins united, scales absent, precaudal vertebrae 26-34, swimblader absent, basibranchial tooth patches absent, opercular spine weak or absent. Viviparous.

Genus ***APHYONUS*** Günther, 1878

Developed gill rakers on anterior arch 3-14, palatine teeth absent, pectoral fin with 13-19 rays, ventral fin with one ray, mouth almost horizontal. Two of the four recognized species (NIELSEN, 1974) are caught in New Caledonian waters.

Source : MNHN, Paris

Aphyonus bolini Nielsen, 1974

Fig. 22

Aphyonus bolini Nielsen, 1974: 179, fig. 1 (type locality: 15°38'N, 111°54'E).

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn CP 69, 23°51.38'S, 167°58.68'E, 1225 m depth, beam trawl, R. V. *"Jean Charcot"*, 3 September 1985: 1 specimen, female 99 mm (MNHN 1994-765).

DESCRIPTION. — Eyes minute, mouth horizontal, peritoneum dark blue. Number of dorsal fin-rays 69, caudal 8, anal 54, pectoral 16, vertebrae 26 + 39, anterior dorsal fin-ray above vertebra no. 19, anterior anal fin-ray below dorsal fin-ray no. 16 and below vertebra no. 29, long gill rakers on anterior arch 13. Head 22% SL, upper jaw 11% SL, depth of body at origin of dorsal fin 13.5% SL, predorsal 38.5% SL, preventral 19% SL, preanal 54% SL.

REMARKS. — *A. bolini* is closely related to *A. brevidorsalis* Nielsen, 1969 but differs by having more long gill rakers (13-14 vs. 9), fewer precaudal vertebrae (26 vs. 32) and a more slender body (depth of body at origin of dorsal fin 13.5 vs 21.0% SL).

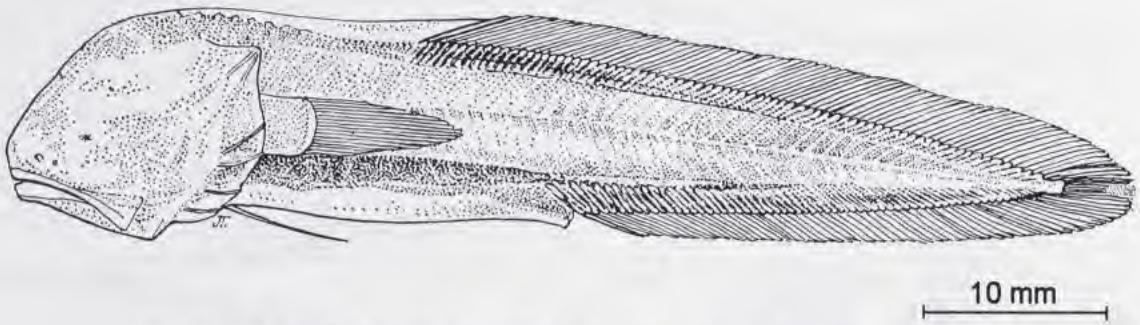

FIG. 22. — *Aphyonus bolini* Nielsen, 1974, holotype, male 59 mm (from NIELSEN, 1974).

DISTRIBUTION. — Known in a few specimens from off New Caledonia, the South China Sea and from off Madagascar (unpublished) at depths between 1075 and 1300 m.

Aphyonus gelatinosus Günther, 1878

Fig. 23

Aphyonus gelatinosus Günther, 1878: 22 (type locality: 12°8'S, 145°10'E).

Aphyonus gelatinosus: NIELSEN, 1969: 15, fig. 1.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn CP 69, 23°51.38'S, 167°58.68'E, 1225 m depth, beam trawl, R. V. *"Jean Charcot"*, 3 September 1985: 1 specimen, female 121 mm (MNHN 1994-766).

DESCRIPTION. — Eyes not visible, mouth horizontal, peritoneum dark blue. Number of dorsal fin-rays 104, caudal 8, anal 65, pectoral 18, vertebrae 29 + 52, anterior dorsal fin-ray above vertebra no. 7, anterior anal fin-ray below dorsal fin-ray no.37 and below vertebra no.34, developed gill rakers on anterior arch 3. Head 25% SL, upper jaw 12.5% SL, depth of body at origin of dorsal fin 19 % SL, predorsal 28.5% SL, preventral 20.5% SL, preanal 54% SL.

Source : MNHN, Paris

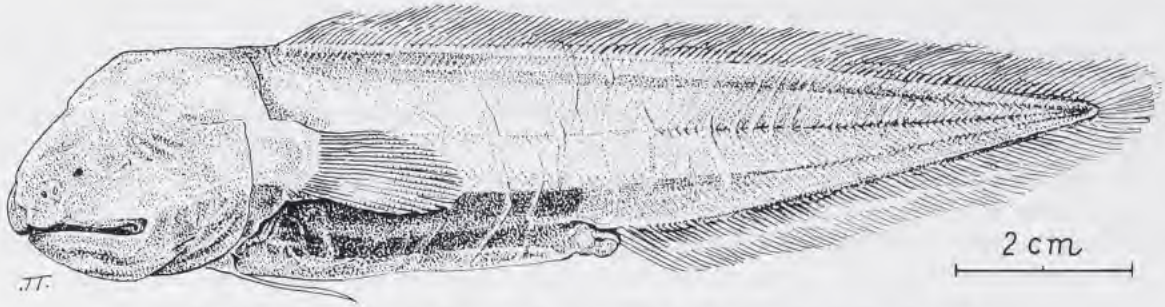

FIG. 23. — *Aphyonus gelatinosus* Günther, 1878, male 121 mm, (from NIELSEN, 1969).

REMARKS. — *A. gelatinosus* differs from all other *Aphyonus* species by having more dorsal fin-rays (93-116 vs. 69-75), more caudal vertebrae (50-53 vs. 38-40) and a shorter predorsal length (ca. 30% SL vs. ca. 40% SL).

DISTRIBUTION. — Known from a number of specimens from all oceans except for the East Pacific at depths between 900 and 2560 m.

Genus ***PARASCIADONUS*** Nielsen, 1984

The description of this genus was based on the type species only. With the description of a second species (see below) it is now possible to make an attempt to separate specific and generic characters. It should be kept in mind that only the holotype is known of each of the two species. Here follows the revised generic diagnosis: a long, slender aphyonid with a protruding lower jaw and an almost horizontal mouth. Head twice as wide as body. Depth of body at origin of anal fin about 7% SL. Eyes extremely small. Dentition very weak with edentate palatines. Predorsal 50-62% SL, preanal 69-72% SL, pectoral peduncle short and broad, no ventral fins. Anterior gill arch with minute tubercles and very small or no filaments. Vertebral centra rectangular in lateral view.

Parasciadonus pauciradiatus sp. nov.

Fig. 24

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL: stn DS 14, 20°18.09'S, 167°17.7'E, 3680-3700 m depth, epipelagic dredge, R. V. *"Jean Charcot"*, 13 August 1985: holotype, female 46 mm (MNHN 1994-767).

DIAGNOSIS AND RELATIONSHIP. — *P. pauciradiatus* differs from the Atlantic *P. brevibrachium*, the only other known species of *Parasciadonus*, in the following characters with *P. brevibrachium* in brackets: Number of dorsal fin-rays 46(72), anal 40(48), pectoral 12(20), precaudal vertebrae 34(50), anterior anal fin-ray below dorsal fin-ray no. 11(33) and below vertebra no. 32(52), no skin flaps along lateral line (12-19 skin flaps).

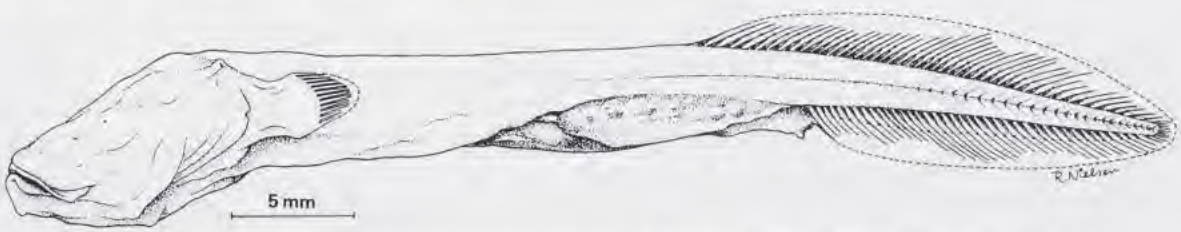

FIG. 24. — *Parasciadonus pauciradiatus* sp. nov., holotype, female 46 mm (MNHN 1994-767).

Source : MNHN, Paris

DESCRIPTION. — (Fig. 24). Number of fin-rays in dorsal 47, caudal 8, anal 40, pectoral 12, ventral 0, vertebrae 34 + 28 anterior dorsal fin-ray above vertebra no. 27, anterior anal fin-ray below dorsal fin-ray no. 11 and below vertebra no. 32, ten very small tubercles on anterior gill arch. Length of head 21% SL, depth of body at origin of anal fin 7.2% SL, length of upper jaw 9.1% SL, preanal length 69% SL, predorsal length 62% SL. Skin loose and transparent. Origin of dorsal fin well behind midpoint of fish. Length of anal fin less than one third of SL. Eyes hardly visible. Nostrils midway between eyes and upper lip. No opercular spine. General colour yellowish with no pigmentation except for the small, black eyes. Median segments of musculi infracarinal mediales twice as long as high (NIELSEN, 1969: 9). The sagittal otolith less than 1 mm long. Teeth very small. Premaxillaries and dentaries with 2-3 rows anteriorly and one row posteriorly, 10-12 teeth in one row on vomer and none on palatines. Gill opening large. Anterior gill arch with ten minute tubercles and no filaments; posterior three arches with somewhat larger tubercles and small filaments. Axial skeleton well ossified (judging from radiographs). Neural spine on anterior vertebra as long as the following spines. Only the three posterior precaudal vertebrae with parapophyses. Apparently no ribs. Centrum of posterior precaudal vertebra about 1.5 times as high as long. Ovaries extended and seem to hold about 25 fertilized eggs with a diameter of 1-1.5 mm. No fleshy appendages developed near genital opening.

DISTRIBUTION. — Only known from the holotype off New Caledonia caught in an epibenthic dredge at 3680-3700 m.

ETYMOLOGY. — The specific name, *pauciradiata*, refers to the relatively few fin-rays when compared to the type species.

REMARKS ON DISTRIBUTION

Even though it seems a little premature to comment on distributional relationship when the ophidiiform deep-sea fauna off New Caledonia is so relatively poorly known (24 species represented by 149 specimens), some notes may give useful information. Seven species seem to be endemic to the area sampled. Six of these belong to the bathyal genus *Neobythites* caught at depths of between 275 and 670 m in numbers of 2-17 specimens each. Their absence in the many trawl hauls undertaken at these depths all over the Indo-Australian region suggests that these six species are true endemics. The seventh endemic, *Parasciadonus pauciradiatus* known from the holotype only, was caught at a depth of 3680-3700 m. Fish from these depths generally have a wide distribution and considering how seldom these abyssal depths are fished it may well be that additional specimens will invalidate endemism for this species.

Two species, *Acanthonus armatus* and *A. gelatinosus*, are cosmopolitans known from c. 1000-4000 m of depth. Of the remaining15 species 1-2, *Bathyonus caudalis* and *Dicrolene longimana* (?), are known from the entire Indo-Pacific region and 1-2, *Pyramodon ventralis* and *Bassozetus glutinosus* (?), have an Indo-West Pacific distribution. Of the final 11 species, six are known only from the Indo-Australian region, five extend to the Indian Ocean also, and two extend also to Japan. Based on the present material the New Caledonian ophidiiform fauna seems to have much more relation to the Indian Ocean and the Indo-Australian region then to the Pacific region.

ACKNOWLEDGMENTS

I wish to thank my colleagues Bernard SÉRET, ORSTOM/MNHN, Guy DUHAMEL, MNHN, and Andrew STEWART, NMNZ, for loan of ophidiiform material from the New Caledonian area and Daniel M. COHEN, LACM, and Nigel R. MERRETT, BMNH, who critically read the manuscript. The illustrations were financed by a grant from the Carlsberg Foundation.

Source : MNHN, Paris

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Notopogon xenosoma Regan, 1914 (Teleostei, Macroramphosidae) en limite de distribution subtropicale aux abords de la Nouvelle-Calédonie et de Madagascar

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ABSTRACT

New Caledonia and Madagascar as northernmost borders for the subtropical distribution of *Notopogon xenosoma* Regan, 1914 (Teleostei, Macrorhamphosidae).

The Macroramphosid fish *Notopogon xenosoma* Regan 1914 is recorded on the northern part of the Norfolk ridge and the southern shelf of New Caledonia from ORSTOM trawl surveys. It becomes the most northernly distribution in the south-west Pacific Ocean for this subtropical species. Other specimens have been identified from Madagascar collections and induces the same conclusion for the south-west Indian Ocean.

RÉSUMÉ

Le Macroramphosidae *Notopogon xenosoma* Regan, 1914 est signalé dans les récoltes effectuées par chalutages lors de campagnes de l'ORSTOM sur la partie nord de la ride de Norfolk et sur le plateau sud de la Nouvelle-Calédonie, ce qui constitue la limite septentrionale de distribution géographique de cette espèce subtropicale dans le Pacifique sud-ouest. De même, des collections de Madagascar étendent vers le nord la répartition de l'espèce dans la partie sud-ouest de l'océan Indien.

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Source : MNHN, Paris

INTRODUCTION

La famille des Macroramphosidae comprend trois genres (NELSON, 1994) dont deux, *Centriscops* et *Notopogon*, strictement inféodés aux zones subtropicale et tempérée de l'hémisphère sud (DUHAMEL, 1995). Dans le dernier genre deux groupes se distinguent par leurs caractères morphologiques/méristiques et leurs distributions latitudinales. Le premier, comportant les espèces *Notopogon armatus* (Sauvage, 1879), *N. lilliei* Regan, 1914 et *N. macrosolen* Barnard, 1925, présente une distribution en zone subtropicale et tempérée, préférentiellement au sud de 30°S alors que le second est plus subtropical. Ce dernier, avec les deux espèces *N. xenosoma* Regan, 1914 et *N. fernandezianus* (Delfin, 1899) est rarement rencontré au delà de 40° S mais remonte jusqu'au Tropique du Capricorne. Dans le cas de *N. xenosoma* des campagnes de chalutages récentes ont permis de collecter des spécimens à des localisations plus septentrionales dans les océans Pacifique et Indien ouest.

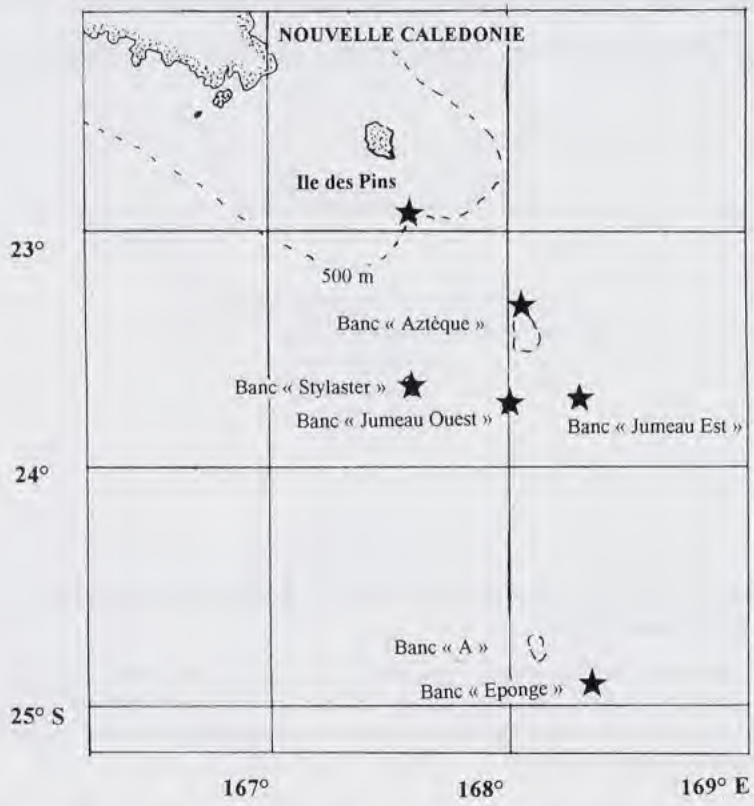

FIG. 1. — Localisation géographique des bancs de la partie septentrionale de la ride de Norfolk et du plateau sud de la Nouvelle-Calédonie sur lesquels des captures (*) de *Notopogon xenosoma* Regan, 1914, ont été enregistrées lors des campagnes de prospection de l'ORSTOM.

MATÉRIEL ET MÉTHODES

Des campagnes de chalutages profonds réalisées par l'ORSTOM au large de la Nouvelle-Calédonie (Fig. 1) : CHALCAL 2 (1986) du N. O. « *Coriolis* », AZTÈQUE (1990) et BERYX 11 (1992) du N. O. « *Alis* » (RICHER DE FORGES *et al.*, 1987 ; GRANDPERRIN *et al.*, 1990 ; LEHODEY *et al.*, 1993) ont permis de collecter deux Macroramphosidae : *Macroramphosus scolopax* (Linnaeus, 1758) et *Notopogon xenosoma*. De plus, des

Source : MNHN, Paris

collections plus anciennes provenant de campagnes du N. O. « *FAO 60* » et du N. O. « *Vauban* » en 1973 au sud de Madagascar recèlent également des spécimens de *N. xenosoma*. Les spécimens conservés en collection sont les suivants :

Notopogon xenosoma. — 14 spécimens.

Ride de Norfolk. CHALCAL 2 : stn CH 7, 24°55'50S, 168°21'10E (banc « Éponge » = mont « B »), 494 m, chalut à panneaux, N. O. « *Coriolis* », 29 octobre 1986 : 1 specimen, 126,2 mm LS (MNHN 1994-24). — Stn CP 25, 23°38'10S, 167°43'12E (banc « Stylaster »), 418 m, 30 octobre 1986 : 11 spécimens, 43,4 à 131,4 mm LS (MNHN 1994-22). — Stn CP 26, 23°18'15S, 168°03'58E (banc « Aztèque »), 296 m, chalut à perche, 31 octobre 1986 : 1 spécimen, 54,0 mm LS (MNHN 1994-21).

AZTEQUE : stn CH 7, 23°37'5S, 167°42'1E (banc « Stylaster »), 425-500 m, chalut à perche, N. O. « *Alis* », 14 février 1990 : 19 spécimens, (sur 31 capturés), 77,0 à 127,5 mm LS (MNHN 1994-23).

BERYX 11 : stn C 3, 24°56'60S, 168°21'25E (Banc « Éponge » = mont « B »), 502-610 m, chalut à panneaux (à poissons), N. O. « *Alis* », 14 octobre 1992 : 1 spécimen, 75,0 mm LS (NMNZ-P.29413) .— Stn C 29, 23°40'50S, 167°44'20E (banc « Stylaster »), 440-480 m, chalut à panneaux (à poissons), 18 octobre 1992 : 1 spécimen, 125,4 mm LS (NMNZ-P.29281). — Stn CP 31, 23°39'12S, 167°43'65E (banc « Stylaster »), 430-440 m, chalut à perche, 18 octobre 1992 : 1 spécimen (sur 6 capturés), 65,5 mm LS (NMNZ-P.29395). — Stn C 36, 23°39'75S, 167°42'90E (banc « Stylaster »), 450-490 m, chalut à panneaux (à poissons), 19 octobre 1992 : 1 spécimen (sur 9 capturés), 100,2 mm LS (NMNZ-P.29175). — Stn CP 46, 23°42'S, 168°01'25E (banc « Jumeau ouest »), 300-350 m, chalut à perche, 20 octobre 1992 : 2 spécimens 86,2 et 88,2 mm LS (NMNZ-P.29145).

Madagascar. N. O. « *Vauban* » : stn 68, 25°08'9S, 47°21'5E, 255 m, chalut à crevettes, 3 mars 1973 : 1 spécimen, 68,5 mm LS (MNHN 1995-18). — Stn 69, 25°07'3S, 47°22'8E, 355-360 m, chalut à crevettes, 3 mars 1973 : 1 spécimen, 119,9 mm LS (MNHN 1995-19).

N. O. « *FAO 60* » : 25°29'S, 46°46'E, 350-360 m, chalut à crevettes, 30 mai 1973 : 4 spécimens, 111,6 à 136,0 mm LS (MNHN 1995-12).

Macrorhamphosus scolopax. — 5 spécimens.

Ride de Norfolk. CHALCAL 2 : stn CP 27, 23°15'29S, 168°04'55E (banc « Aztèque »), 289 m, chalut à perche, N. O. « *Coriolis* », 31 octobre 1986, 3 spécimens, 61,9 ; 88,9 et 97,0 mm LS (MNHN 1995-519). — Stn DW 81, 23°19'60S, 168°03'40E, 311 m, drague Waren, 31 octobre 1986 : 1 spécimen (MNHN 1995-520).

BERYX 11 : stn CP 44, 23°41'30S, 168°00'57E (banc « Jumeau ouest »), 230-250 m, chalut à perche, N. O. « *Alis* », 20 octobre 1992 : 1 spécimen, 80,0 mm LS (NMNZ-P.29183).

Par ailleurs, les rapports des campagnes précitées mentionnent la capture d'autres spécimens de *N. xenosoma* mais qui n'ont pas été conservés :

Ride de Norfolk. AZTEQUE : stn CC 5, 23°38'9S, 168°00'E (banc « Jumeau ouest », 235-360 m, chalut à crevettes, N. O. « *Alis* », 14 février 1990 : 2 spécimens. — Stn CC 6, 23°37'9S, 167°42'5E (banc « Stylaster »), 425-470 m, chalut à crevettes, 14 février 1990 : 18 spécimens. — Stn CC 10, 22°52'8S, 167°33'5E (sud de l'Ile des Pins), 350-360 m, chalut à crevettes, 15 février 1990 : 1 spécimen.

BERYX 11 : stn CC 30, 23°30'85S, 167°42'15E (banc « Stylaster »), 420-470 m, chalut de fond (à poissons), N. O. « *Alis* », 18 octobre 1992 : 3 spécimens. — Stn CP 32, 23°37'70S, 167°43'45E (banc « Stylaster »), 420-460 m, chalut à perche, 18 octobre 1992 : 15 spécimens. — Stn C 33, 23°37'00S, 167°42'50E (« Stylaster »), 450-480 m, 18 octobre 1992 : 1 spécimen. — Stn 49, 23°45'22S, 168°17'06E (banc « Jumeau est »), 400-460 m, 20 octobre 1992 : 33 spécimens. — Stn C 50, 23°47'70S, 168°16'75E (banc « Jumeau est »), 420-480 m, chalut de fond (à poissons), 21 octobre 1992 : 5 spécimens. — Stn CP 51, 23°44'50S, 168°16'70E (banc « Jumeau est »), 390-400 m, chalut à perche, 21 octobre 1992 : 13 spécimens. — Stn CP 52, 23°47'45S, 168°17'05E (banc « Jumeau est »), 430-530 m, 21 octobre 1992 ; 17 spécimens. — Stn C 54, 23°44'80S, 168°16'85E (banc « Jumeau est », 390-420 m, 21 octobre 1992 : 2 spécimens.

Le matériel examiné concernant *N. xenosoma* provient des collections du MNHN, Paris (n = 38) et du NMNZ, Museum of New Zealand Te Papa Tongarewa, Wellington (n = 7). Certaines données concernant des poissons des collections de l'AMS, Australian Museum, Sydney, du CSIRO, Division of Fisheries, Hobart (Tasmania), du RUSI, JLB Smith Institute of Ichthyology, Grahamstown (South Africa), du SAM, South African Museum, Cape Town et du WAM, Western Australian Museum, Perth ont également été utilisées.

Source : MNHN, Paris

Les abbréviations concernant les caractères morphologiques et méristiques sont les suivantes :

LT	longueur totale
LS	longueur standard
HL	longueur de la tête
LP	longueur de la nageoire pectorale
PréO	distance préorbitaire
$PréD_1$	distance prédorsale D_1
$PréD_2$	distance prédorsale D_2
PréA	distance préanale
PréP	distance prépectorale
PréV	distance prépelvienne
$L D_1$	longueur de la base de la nageoire dorsale D_1
$L D_2$	longueur de la base la nageoire dorsale D_2
LA	longueur de la base de la nageoire anale
L2sp	longueur du deuxième rayon de D_1
O	diamètre orbitaire
$P D_1$	distance du bord antérieur de la base de la nageoire pectorale au bord antérieur de la base de D_1
$P D_2$	distance du bord antérieur de la base de la nageoire pectorale au bord antérieur de la base de D_2
PA	distance du bord antérieur de la base de la nageoire pectorale au bord antérieur de la base de l'anale
HV	hauteur du corps au niveau du bord antérieur de la nageoire pelvienne
HA	distance entre le bord antérieur de la nageoire anale et l'insertion du deuxième rayon de D_1
Hpc	hauteur du pédoncule caudal
D_2	nombre de rayons à la nageoire dorsale
A	nombre de rayons à la nageoire anale
P	nombre de rayons à la nageoire pectorale
Ve	nombre de vertèbres

Le nombre de rayons à D_1 et V étant constant, ces derniers n'ont pas été considérés. Les mensurations ont été enregistrées en millimètres et, en dehors de LT et LS, converties en pourcentage de LS.

CONSIDÉRATIONS SYSTÉMATIQUES

Dans une révision systématique récente (DUHAMEL, 1995), incluant l'analyse détaillée de tous les spécimens provenant des collections MNHN et NMNZ des campagnes ORSTOM, les caractéristiques morphologiques et méristiques des spécimens de *Notopogon* ont permis de vérifier leur appartenance à l'espèce *N. xenosoma*. Cette dernière appartient au groupe possédant seulement trois plaques épaxiales dont la troisième inférieure présente une épine bien développée. Ces caractéristiques sont partagées avec *N. fernandezianus* qui possède une distance préorbitaire plus élevée (28,2 à 31,6 % de LS) que celle de *N. xenosoma* (20 à 27,7 % de LS) dans le cas de spécimens de taille supérieure à 99 mm LS.

L'espèce se caractérise par son museau de forme tubulaire terminé par un petit bec, des plaques dermiques latérales développées latéralement sur le corps dans sa partie antérieure de part et d'autre d'une ligne latérale sinueuse, des scutes ventrales formant une carène épineuse, un deuxième rayon épineux de la nageoire dorsale très développé, la présence de petites scutes épineuses dressées sur tout le corps donnant un aspect rèche au toucher, d'une bosse nucale très marquée rompant le profil dorsal laquelle est suivie d'une brosse présente même chez les plus petits individus. Les transformations morphologiques les plus significatives au cours de la croissance peuvent se suivre à partir d'un échantillon de gamme de tailles variée (Fig. 2). Elles concernent principalement une diminution des proportions de certains caractères comme HL, L2SP et préO alors que d'autres augmentent de

Source : MNHN, Paris

manière sensible (HV, HA, P-D1, PD2) ce qui peut se retrouver à partir des données obtenues sur l'échantillon examiné (Tableau 1) même si ce dernier ne comporte que peu de spécimens étudiés.

TABLEAU 1. — Caractéristiques morphologiques (exprimées en % de LS) et méristiques des spécimens de *Notopogon xenosoma* Regan, 1914, collectés au cours des campagnes de chalutage des N. O. « *Coriolis* » et « *Alis* » dans l'océan Pacifique sud-ouest (NC = Nouvelle Calédonie) et des N. O. « *FAO 60* » et « *Vauban* » dans l'océan Indien sud-ouest (MAD = Madagascar). Les abbréviations sont définies dans le texte.

COLL.	NUMERO	LIEU	LT (mm)	LS (mm)	HL	LP	LD1	LD2	LA	L2sp	O	PréD1	% de PréD2	LS PréA	PréP	PréV	Pré0	HV	HA	Hpc	P-D1	P-D2	P-A	rayons D2 (n)	rayons A (n)	rayons P (n)	Ve (n)
MNHN	1994-22	NC	52,4	43,4	50,9	21,5	12,2	10,0	12,9	50,8	10,3	88,5	89,2	81,6	52,7	71,4	30,1	44,6	41,8	7,9	44,5	38,8	30,3	16	17	16	24
MNHN	1994-22	NC	58,0	49,1	49,7	21,5	15,9	11,0	14,2	46,3	9,5	93,8	91,0	80,7	53,6	70,0	31,2	47,4	44,9	8,5	47,7	40,5	29,2	16	18	15	24
MNHN	1994-21	NC	65,6	54,0	51,4	23,7	19,5	10,9	14,5	44,4	12,5	98,5	93,4	80,9	54,2	68,5	30,7	48,0	42,6	7,2	55,6	43,9	27,5	16	18	16	24
NMNZ	P29395	NC	79,8	65,5	48,7	25,5	18,7	10,9	13,4	43,8	12,5	98,0	92,8	79,0	51,1	70,7	26,7	48,8	49,2	6,9	56,9	45,2	29,6	16	18	16	24
NMNZ	P29413	NC	91,5	75,0	49,2	25,9	22,4	11,3	14,5		11,7	100,6	91,6	79,9	51,2	71,4	27,6	49,0	50,0	7,6	59,7	45,2	30,1	15	18	16	24
MNHN	1994-23	NC	93,3	77,0	48,2	26,4	20,8	12,3	15,3	36,5	11,7	98,9	92,1	80,4	51,0	69,7	25,9	50,3	53,6	6,8	58,3	45,9	30,7	16	18	16	
MNHN	1994-23	NC	95,8	77,5	49,1	28,5	22,3	12,1	15,3		14,2	98,0	91,7	80,4	52,5	72,3	25,3	49,4	52,8	7,1	57,1	44,3	29,3	15	18	16	
MNHN	1994-23	NC	95,5	77,6	47,9	25,5	18,1	12,2	15,3	36,5	13,3	95,8	89,8	80,3	50,1	70,6	24,5	48,6	50,8	7,3	56,7	45,3	31,1	15	18	15	
MNHN	1994-22	NC	99,9	80,5	47,4	28,0	21,1	12,6	17,3	37,1	13,0	97,8	93,2	79,0	49,7	70,2	23,5	54,3	54,9	8,0	60,2	48,4	32,1	16	18	16	24
MNHN	1994-22	NC	98,3	80,8	48,0	24,8	20,7	12,4	15,6	36,8	12,8	99,7	91,3	77,0	50,5	68,1	25,3	51,8	51,4	6,9	58,0	43,6	29,7	16	18	16	24
MNHN	1994-23	NC	105,3	85,7	45,9	26,7	19,0	11,9	14,8	31,3	13,9	95,5	90,9	76,7	48,7	65,5	23,4	49,5	50,7	7,6	55,2	46,1	31,0	16	18	16	
NMNZ	P29145	NC	103,2	86,2	46,6	23,0	21,2	13,2	16,3	33,9	12,4	99,3	92,5	78,8	48,7	67,8	25,4	51,5	52,9	7,1	59,3	45,4	31,2	16	18	16	24
NMNZ	P29145	NC	107,5	88,2	45,5	23,2	23,1	14,3	16,4	35,4	11,7	98,9	91,2	76,3	47,1	66,7	24,0	51,3	56,5	7,8	63,7	49,6	31,3	16	18	15	24
MNHN	1994-23	NC	106,4	88,8	45,0	25,9	21,0	11,9	14,7	34,5	11,8	96,1	91,2	79,2	47,4	69,1	21,8	52,3	53,7	6,5	57,6	47,9	33,6	16	17	16	
MNHN	1994-22	NC	110,9	91,1	44,7	25,7	17,6	11,8	15,5	35,3	13,1	92,5	91,0	79,3	48,1	68,3	22,9	47,1	48,1	6,7	54,5	49,5	32,1	16	18	15	24
MNHN	1994-22	NC	112,4	91,6	46,7	25,0	19,9	13,3	17,0	31,4	13,2	101,7	93,7	78,9	49,7	68,8	22,6	54,2	54,5	7,3	61,7	48,2	32,9	15	17	16	24
MNHN	1994-23	NC	118,3	96,9	44,3	26,0	19,6	12,3	14,9	32,4	12,5	95,1	91,1	77,3	47,6	67,5	22,2	55,6	53,5	7,4	58,3	47,8	31,9	16	18	16	
MNHN	1994-22	NC	120,1	98,6	47,0	26,0	21,6	11,7	14,7	30,0	13,2	100,3	93,2	79,0	49,3	68,7	23,9	52,1	49,6	7,3	59,5	47,2	32,4	16	18	16	24
MNHN	1994-22	NC	119,1	99,1	46,3	26,2	20,0	12,5	15,2	29,9	12,5	97,3	91,6	79,2	50,4	69,7	24,5	49,8	52,0	7,5	58,7	46,4	31,5	16	18	15	24
NMNZ	P29175	NC	122,6	100,2	44,7	27,7	17,6	13,7	16,7	35,0	12,1	92,5	90,5	76,9	47,2	66,8	23,5	50,5	51,9	7,1	55,8	48,4	31,6	16	18	16	24
MNHN	1994-22	NC	127,5	103,5	44,6	25,2	20,3	13,1	16,4	32,3	12,0	96,3	92,4	76,7	47,7	65,5	22,8	50,2	49,5	7,3	59,0	49,0	31,1	16	18	16	
MNHN	1994-23	NC	124,7	104,3	44,2	25,5	22,2	12,5	15,7	28,8	13,0	97,1	91,3	77,3	47,2	66,7	21,8	53,4	55,0	7,2	60,2	48,5	31,1	16	18	16	
MNHN	1994-23	NC	126,2	104,5	47,4	26,0	21,4	12,9	16,4		13,3	99,6	91,2	78,2	51,0	68,3	25,4	53,4	53,1	7,2	59,4	45,4	29,1	16	18	16	
MNHN	1994-22	NC	130,4	106,3	45,3	26,0	23,1	14,4	17,0	33,3	12,7	98,4	91,2	77,4	47,2	67,7	23,1	53,9	55,8	7,5	63,6	48,2	32,9	16	19	16	24
MNHN	1994-23	NC	132,7	107,0	44,8	26,9	21,3	13,9	16,3	30,6	12,1	96,7	92,8	76,5	47,9	66,6	22,1	54,5	55,6	7,3	59,1	47,6	30,6	16	18	16	
MNHN	1994-23	NC	134,8	110,8	42,9	26,5	18,8	13,2	15,8	31,9	12,6	92,8	92,7	78,8	46,3	68,6	20,8	52,5	54,7	7,2	55,7	49,8	34,7	16	18	16	
MNHN	1994-23	NC	135,0	111,5	44,2	26,6	20,6	14,2	17,2	25,6	12,2	98,6	92,8	78,0	46,8	66,8	21,7	51,7	55,0	7,5	61,9	50,4	33,5	16	18	16	
MNHN	1994-23	NC	135,5	111,6	44,9	26,2	20,7	13,2	16,5	26,9	11,9	93,9	90,8	75,9	48,2	66,2	23,4	51,2	52,8	7,2	56,5	47,3	31,6	16	19	16	
MNHN	1994-23	NC	138,7	112,0	45,8	27,6	22,7	13,7	17,2		11,7	101,6	96,2	79,4	48,9	69,6	23,0	55,8	58,8	7,4	62,5	51,0	34,1	16	19	16	
MNHN	1994-23	NC	136,8	112,1	46,3	25,2	20,2	14,3	17,4	28,4	11,2	96,3	92,6	79,8	49,7	70,4	24,9	53,2	52,9	7,0	59,0	49,4	32,8	16	18	17	
MNHN	1994-23	NC	136,2	112,8	43,2	26,8	21,8	14,0	17,2	29,4	12,0	97,0	93,6	77,7	47,0	65,6	21,6	58,6	58,8	7,6	60,5	51,3	33,2	16	18	16	
MNHN	1994-23	NC	138,6	115,1	42,8	26,9	20,9	13,9	17,0	27,1	11,5	96,1	90,8	76,1	46,0	64,7	22,3	53,5	54,1	6,9	58,7	48,8	33,4	16	18	16	
MNHN	1994-23	NC	144,7	117,6	44,0	27,0	18,6	13,1	16,0	28,1	10,9	91,7	90,5	79,7	47,4	68,6	22,0	54,8	52,8	7,8	56,4	49,0	34,5	16	18	16	
MNHN	1994-23	NC	148,1	122,2	44,1	25,4	21,4	14,5	18,0	25,5	10,9	97,0	91,4	77,4	48,1	68,5	23,2	54,4	55,1	7,6	59,7	46,5	29,8	17	18	16	
NMNZ	P29281	NC	149,3	125,4	43,2	23,8	21,2	13,3	16,5	21,1	11,2	97,6	93,4	75,9	45,9	63,8	22,8	50,8	57,8	7,6	60,0	50,1	32,7	15	18	16	24
MNHN	1994-24	NC	149,8	126,2	45,0	25,7	24,8	14,2	17,8		10,4	103,3	93,9	76,4	48,9	66,8	24,8	51,9	48,1	7,7	64,7	48,6	30,5	16	18	16	24
MNHN	1994-23	NC	152,8	127,5	43,0	24,4	21,7	14,9	17,4	28,4	10,4	94,1	89,4	76,1	46,9	67,3	22,9	54,2	58,9	7,7	57,5	48,6	33,8	16	18	16	
NMNZ	P29281	NC	155,4	127,8	41,5	25,1	20,5	14,1	17,0	27,1	11,6	93,5	90,0	77,3	45,4	67,7	20,0	58,0	58,4	7,9	59,2	50,1	34,8	16	18	16	24
MNHN	1994-22	NC	158,3	131,4	41,0	24,3	21,6	13,5	16,8	24,7	10,9	92,2	89,8	75,7	44,2	65,4	20,8	54,9	48,1	7,5	57,2	49,1	34,6	15	17	16	
MNHN	1995-18	MAD	82,0	68,5	48,6	24,1	17,6	12,4	15,8		11,5	96,2	91,7	78,7	49,9	66,7	27,6	52,3	53,0	7,0	56,5	45,8	30,2	16	18	16	
MNHN	1995-12	MAD	133,2	111,6	46,8	23,5	22,6	12,1	15,7	31,6	11,4	99,6	92,9	77,9	49,2	65,7	26,7	56,7	58,1	6,7	61,2	48,0	30,5	16	18	16	
MNHN	1995-12	MAD	142,1	119,6	44,9	23,0	19,9	12,8	16,3	32,1	10,8	97,0	91,3	77,3	47,0	63,9	24,6	55,7	55,9	6,6	60,3	48,6	31,7	16	18	16	
MNHN	1995-19	MAD	144,4	119,9	44,6	26,0	22,5	13,6	16,2		11,6	96,9	93,4	76,0	46,5	63,6	23,6	56,5	60,9	6,9	60,0	49,9	31,4	16	18	16	
MNHN	1995-12	MAD	150,8	122,3	46,2	24,7	22,7	13,8	16,9	27,5	11,3	101,5	93,6	78,3	48,2	65,9	25,6	58,3	61,0	6,7	64,9	51,1	32,4	16	18	16	
MNHN	1995-12	MAD	163,1	136,0	43,6	23,8	20,5	14,2	16,7	26,7	10,0	92,5	90,9	76,0	47,1	65,1	24,4	55,1	57,0	6,9	58,3	49,0	30,2	16	18	16	

DISCUSSION

La distribution géographique de *N. xenosoma* s'étend de l'Afrique australe à la Nouvelle-Zélande (DUHAMEL, 1995) entre le Tropique du Capricorne et la limite de la région subtropicale laquelle varie en latitude suivant les océans et les abords des continents. Le reste de la zone équivalente de l'hémisphère sud des océans Pacifique Est et Atlantique Ouest est occupé par *N. fernandezianus*.

Les captures de *N. xenosoma* au large de la Nouvelle-Calédonie prouvent que l'espèce y est fréquente dans le domaine de sa distribution bathymétrique habituelle. Les prospections des bancs de la partie nord de la ride de Norfolk ont permis de déceler la présence de l'espèce parfois en nombre, même si l'abondance peut être liée à l'intensité de prospection. Ainsi, si un seul spécimen a été collecté sur le banc « Aztèque », ce sont 91 spécimens qui proviennent du banc « Stylaster », 2 du banc « Éponge », 4 du banc « Jumeau ouest » et 70 du banc « Jumeau est ». De même, la prospection du plateau au sud de l'île aux Pins a permis de signaler la présence de l'espèce. Cette dernière signalisation représente l'extension géographique la plus septentrionale de cette espèce subtropicale dans l'océan Pacifique sud-ouest (une autre espèce, *N. fernandezianus*, occupe le Pacifique sud-est). En effet, au large de la côte australienne la signalisation la plus tropicale est : 23°13'S - 153°38E (collection CSIRO H720-15). La distribution bathymétrique observée dans l'échantillon étudié est comprise entre 295 et, au minimum, 530 m

Source : MNHN, Paris

(610 m possible) ce qui n'est pas très différent de celle rencontrée pour l'ensemble des autres secteurs où l'espèce est observée (125-710 m) (DUHAMEL, 1995). Il est à remarquer qu'à des profondeurs inférieures, *M. scoloplax* se substitue à *N. xenosoma* puisque cette espèce n'est signalée que pour des prélèvements compris entre 230 et 310 m. Enfin, la gamme de taille comprend des spécimens juvéniles et des adultes puisqu'elle est comprise entre 43,4 et 131,4 mm LS. Cette gamme n'est pas très différente de celle notée (43,4-152,3 mm LS) dans l'aire générale de distribution.

FIG. 2. — Spécimens de *Notopogon xenosoma* Regan, 1914, de tailles comprises entre 43,4 et 131,4 mm LS (MNHN 1994-22). Campagne CHALCAL 2 du N. O. « *Coriolis* » sur le banc « Stylaster », stn CP 25, 23°38'10S, 167°43'12E, 418 m, chalut à perche, 30 octobre 1986.

Les signalisations de l'espèce sur la zone profonde du plateau de Madagascar (255-360 m) constituent également pour l'océan Indien occidental une limite d'extension septentrionale (25°07'S). En effet, sur la côte Est de l'Afrique la localisation la plus nord se situe par 27°31'S (collection SAM 27173) et les seules signalisations

Source : MNHN, Paris

sur des bancs, d'ailleurs assez éloignés, le sont pour le banc Walters situé bien au sud de Madagascar (collection RUSI 31331 : n=1 ; collection AMS-I.28175 : n=2). Il faut cependant remarquer que sur la côte ouest-australienne de l'océan Indien oriental l'espèce remonte légèrement plus en zone tropicale avec une signalisation à 24°40'S (collection WAM-P.29732-014). Enfin l'échantillon restreint de spécimens analysés comprend cependant des poissons de gamme de taille assez complète (68,5-136,0 mm LS) et les profondeurs relevées (255-360 m) correspondent à celles du rebord du plateau continental, comme dans d'autres secteurs géographiques.

L'analyse des captures des différentes campagnes BERYX réalisées sur le Ride de Norfolk, au sud-est de la Nouvelle-Calédonie ne permet d'identifier (GRANDPERRIN *et al.*, 1991 ; GRANDPERRIN *et al.*, 1992 ; LEHODEY *et al.*, 1992 ; LEHODEY *et al.*, 1992) qu'une seule autre espèce à répartition subtropicale/tempérée comme *N. xenosoma*. Il s'agit du Centrolophidae *Hyperoglyphe antarctica* (Carmichael, 1818) qui est d'ailleurs également capturé en zone profonde. Ces résultats démontrent que la zone tropicale, même profonde, possède une ichtyofaune bien différenciée et que les espèces *N. xenosoma* et *H. antarctica* s'y trouvent en limite extrême de leur répartition géographique.

REMERCIEMENTS

Je remercie B. SÉRET pour avoir mis à ma disposition les spécimens des campagnes CHALCAL 2 et AZTEQUE et C. ROBERTS pour m'avoir fait parvenir les spécimens en collection au NMNZ de la campagne BERYX 11. A. CROSNIER en transmettant les collections ichtyologiques du « *FAO 60* » et du « *Vauban* » m'a permis de découvrir des spécimens à Madagascar, je lui en suis reconnaissant.

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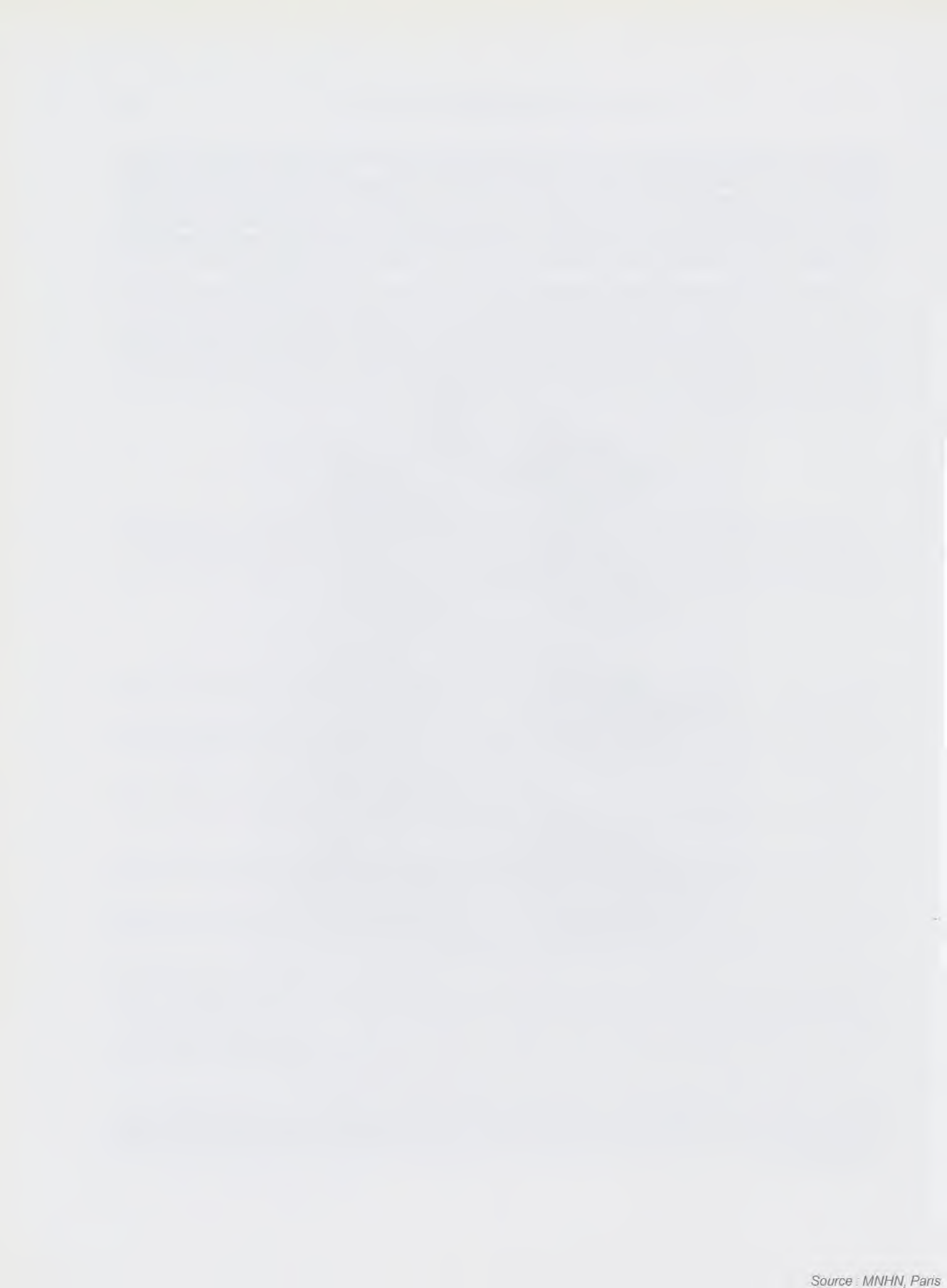
Source : MNHN, Paris



Source : MNHN, Paris

6

Gurnard Fishes (Scorpaeniformes, Triglidae) from off New Caledonia, with description of five new species

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ABSTRACT

Eighteen bathyal species of Triglidae are recorded from the New Caledonian economic zone, of which five are new species (*Lepidotrigla annamarae, L. musorstom, L. nana, L. sereti,* and *Pterygotrigla robertsi*) and one is a new subspecies (*L. alcocki vaubani*). A key to all species is presented.

RÉSUMÉ

Grondins (Scorpaeniformes, Triglidae) de Nouvelle-Calédonie, avec la description de cinq espèces nouvelles.

Dix-huit espèces de grondins sont recensées de l'étage bathyal de la Zone Économique de Nouvelle-Calédonie. Cinq espèces (*Lepidotrigla annamarae, L. musorstom, L. nana, L. sereti,* et *Pterygotrigla robertsi*) et une sous-espèce (*L. alcocki vaubani*) sont décrites comme nouvelles. Une clef d'identification des espèces traitées dans cette étude est proposée.

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Source : MNHN, Paris

INTRODUCTION

Despite the environmental diversity of New Caledonia, there are relatively few studies on its ichthyofauna. FOURMANOIR & RIVATON (1979) described one new species of triglids from the area. Recently published checklists (RIVATON, 1989; RIVATON *et al.*, 1990) present an overview of the fish fauna, but very few species of Triglidae are listed.

The MUSORSTOM cruises in the Economic Zone of New Caledonia (see RICHER DE FORGES, 1990 for cruise reports) have carried out extensive sampling and yielded large numbers of specimens and taxa, including fishes of the family Triglidae. This is the first contribution dealing specifically with the representatives of this family in the New Caledonian region.

In modern systematic ichthyology, Triglidae and Peristediidae are treated as separate families or as subfamilies within the family Triglidae. Pending further studies on triglid phylogeny, we follow the opinion of NELSON (1990, pers. comm.) that "as long as we think that Triglinae and Peristediinae form a monophyletic lineage I prefer to combine them ".

METHODS

We present detailed descriptions of the new species but known species now recorded from New Caledonian waters are not redescribed, except when the original description was insufficient. Synonymy and type data of known species are given where appropriate. In the diagnosis and description of new species, data on the holotype are given first, followed in parentheses by those on the paratypes. The list of material examined includes cruise, station, geographical coordinates and depth where the specimens were captured, total length and, in parentheses, standard lengths of specimens.

Total and standard lengths are measured without the rostral processes. The length of the pectoral fin is measured from the upper axil of the fin to the posterior tip of its longest joined ray. The length of the first free pectoral ray (the uppermost) is measured from the upper axil of the ray to its posterior tip. The post-opercular length of the cleithral spine is the horizontal distance measured between the vertical lines at the level of the posterior edge of the opercular flap to that in the posterior tip of the cleithral spine. The height of the head is the vertical distance measured at the posterior edge of the orbit. Notation for the number of gill-rakers (GR) corresponds to the total number in the first left branchial arch (epibranchial plus ceratobranchial). The letter R refers to rudiments before or after the true gill-rakers. Throughout the paper, "rostral processes" are the forward extension of the first infraorbital bone, i.e. the forward directed bony structures of the head usually going beyond the pre-maxillary symphysis. We have mostly used this term as a synonym of "rostral appendages " and "rostral exertions " of other authors.

Abbreviations used: TL: total length; SL: standard length; HL: head length; PO: preorbital length (not including the rostral processes); OL: orbit length; D_1: first dorsal fin; D_2: second dorsal fin; P: pectoral fin; A: anal fin; LL: number of scales on the lateral line; GR: gill-rakers on the first left branchial arch.

Institutions and repositories: AMS: Australian Museum, Sydney, Australia; BMNH: The Natural History Museum, London, United Kingdom; IIPB: Institut de Ciències del Mar, Barcelona, Spain; IZUA: Instituto de Zoología, Universidad Austral de Chile, Valdivia, Chile; MNHN: Muséum National d'Histoire Naturelle, Paris, France; NMNZ: Museum of New Zealand, Wellington, New Zealand; NSMT: National Science Museum (Natural History), Tokyo, Japan; USNM: National Museum of Natural History, Washington, DC, USA.

Source : MNHN, Paris

SYSTEMATIC ACCOUNT

IDENTIFICATION KEY TO THE TRIGLIDS OF NEW CALEDONIA

Family **TRIGLIDAE**

1 Body completely covered by bony plates. Teeth lacking in both jaws or only present on upper jaw. Tongue absent or vestigial. Without cleithral spine. Barbels around mouth conspicuous. Pectoral fins with two free rays ..... Subfamily **PERISTEDIINAE** (2)

1' Body completely covered by scales (ctenoid and/or cycloid). Teeth present in both jaws and may exist on vomer and palatines. Tongue present. With a cleithral spine which may be apparent, reduced or embedded in skin. No conspicuous barbels around mouth. Pectoral fins with three free rays ..... (3)

Subfamily **PERISTEDIINAE**

2 Upper jaw with a band of teeth ..... Tribe **GARGARISCINI** (4)

2' Teeth lacking in both jaws ..... Tribe **PERISTEDIINI** (5)

Subfamily **TRIGLINAE**

3 With bony plates set in front and at both sides of first dorsal fin base. Scales of body small, cycloid, not imbricated and embedded in skin ..... Tribe **PTERYGOTRIGLINI** (8)

3' With spiny bucklers erect or not on first dorsal fin base; spiny bucklers always erect on second dorsal fin base. Scales ctenoid and/or cycloid and imbricated ..... Tribe **TRIGLINI** (13)

Tribe **GARGARISCINI**

4 A small, weakly developed spine present at lower preopercular angle ..... Genus ***Heminodus***
(no species found in the area)

4' A long and well developed spine at lower preopercular angle ..... Genus ***Paraheminodus***
(only one species: ***P. murrayi***)

Tribe **PERISTEDIINI**

5 Head narrow, sub-rectangular. A vestigial or even absent spine at lower preopercular angle ..... Genus ***Peristedion***
(only one species: ***P. picturatum***)

5' Head wide, sub-triangular. A well developed spine at lower preopercular angle ..... Genus ***Satyrichthys*** (6)

6 Filamentous barbel very long, reaching vent ..... ***S. orientale***

6' Filamentous barbel very short, hardly reaching first ventral scute 7

7 Rostral processes convergent and expanded at anterior tip ..... ***S. moluccense***

7' Rostral processes sub-parallel or slightly divergent ..... ***S. quadratorostratus***

Tribe **PTERYGOTRIGLINI**

8 Rostral processes short, their length lesser than orbit length. Preorbital length (without rostral processes) smaller than half of head length ..... Genus ***Pterygotrigla*** (9)

Source : MNHN, Paris

8' Rostral processes long, about twice length of orbit length. Preorbital length (without rostral processes) equal or lesser than half of head length..... Genus ***Parapterygotrigla*** (**12**)

9 Scales of lateral line enlarged, much higher than long. Posterior tip of pectoral fin not reaching middle of anal fin length ..... ***P. macrolepidota***

9' Scales of lateral line sub-circular or tubular. Posterior tip of pectoral fin extending beyond middle of ventral fin length **10**

10 Cleithral spine very short or absent, reduced to a rounded, not very evident, basal plate .....***P. tagala***

10' Cleithral spine is long and sharp, with a wide base **11**

11 Opercular spine inconspicuous, not extending beyond posterior margin of opercular flap ....***P. robertsi*** sp. nov.

11' Opercular spine very long and stout, clearly extending beyond posterior margin of opercular flap.....***P. picta***

12 Pectoral fin very long, reaching to or extending beyond posterior end of anal fin. Rostral processes parallel or slightly convergent, with a small antrose spine, on their outer part base ..... ***P. multiocellata***

12' Pectoral fin short, not extending beyond a vertical line at middle of anal fin. Rostral processes slightly divergent and without spine on their base ..... ***P. megalops***

Tribe **TRIGLINI**

13 Head with a post-ocular groove complete (from side to side) or incomplete (limited to a furrow behind orbits). Body scales usually large and ctenoid, sometimes cycloid in ventral region. Less than 70 scales in lateral line. Teeth on vomer present or absent .....Genus ***Lepidotrigla*** (**14**)

13' No post-ocular groove in occipital region. Body scales usually small and cycloid. More than 70 scales in lateral line. Teeth always present on vomer..... Genus ***Chelidonichthys*** (no species found in the area)

14 Post-ocular groove complete. .....***L. grandis***

14' Post-ocular groove incomplete **15**

15 Length of pectoral fin less than head length . Posterior tip of pectoral fin at same level as that of ventral fin .....***L. alcocki vaubani*** subsp. nov.

15' Length of pectoral fin equal to or greater than head length. Posterior tip of pectoral fin reaching beyond ventral fin tip **16**

16 Spines of first dorsal fin, when depressed, reaching second dorsal fin origin.....***L. nana*** sp. nov.

16' Spines of first dorsal fin, when depressed, not reaching second dorsal fin origin **17**

17 A spine present on outer margin of head, half way between orbit and rostral processes. Pectoral fin completely white and without markings on either side .....***L. sereti*** sp. nov.

17' No spine on outer margin of head. Pectoral fin blackish, mostly visible on inner side **18**

18 Uppermost free pectoral ray reaching posterior tip of ventral fin .....***L.*** sp. cf. ***abyssalis***

18' Uppermost free pectoral ray not reaching posterior tip of ventral fin **19**

19 Pectoral fin very long, its posterior tip reaching level of base of tenth anal fin ray or extending beyond anterior anal fin origin by a distance of about twice orbit length ....***L. musorstom*** sp. nov.

19' Pectoral fin relatively short, its posterior tip reaching level of the base of third anal fin ray or extending beyond anterior anl fin origin by a distance of about one orbit length ....***L. annamarae*** sp. nov.

Source : MNHN, Paris

Family **TRIGLIDAE**
Subfamily **PERISTEDIINAE**

Genus ***PARAHEMINODUS*** Kamohara, 1957

Paraheminodus murrayi (Günther, 1880)

Peristethus murrayi Günther, 1880: 52-53, pl. XXXIIa. Locality: Banda Sea in 200 fathoms (= 366 m).

Satyrichthys murrayi: KAMOHARA, 1952: 9-10. — OCHIAI & YATOU *in* MASUDA *et al.*, 1984: 335-336.
Paraheminodus murrayi: MILLER, 1974: 70.

MATERIAL EXAMINED. — 5 specimens.
Banda Sea. Holotype (BMNH 1879-5-14-265) 178.2 mm TL (161.2 mm SL), capture data unknown, 360 m depth.
Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CC 365, 19°42.8'S, 158°48.0'E, 710 m depth, otter trawl, R. V. "*Coriolis*", 19 October 1986: 3 specimens, 265, 230 and 214 mm TL (respectively 234, 202 and 187 mm SL) (MNHN 1995-515). — Stn CC 366, 19°45.4'S, 158°45.6'E, 650 m depth, 19 October 1986: 1 specimen, 234 mm TL (caudal fin broken) (MNHN 1995-486).

DIAGNOSIS. — A band of villiform teeth in the upper mandible. Head broadly expanded laterally. A long and well developed spine in lower preopercular angle. Rostral processes about 3.5 in HL, flattened, nearly parallel and expanded at tip. Seven pairs of barbels including the filamentous one. Posterior tip of pectoral fin reaching level of 6th to 8th anal rays. D_1 VII; D_2 20-22; A 20-22; P 14-15; GR 12 + R.

DISTRIBUTION. — New Caledonia. Banda Sea (GÜNTHER, 1880), Japan (KAMOHARA, 1952), Tosa Bay (OCHIAI & YATOU *in* MASUDA *et al.*, 1984).

REMARKS. — The MUSORSTOM specimens differ in several morphometric and meristic characters from the holotype, e.g. the mesethmoidal spine is absent in the latter but present in all New Caledonian specimens.

Genus ***PERISTEDION*** Lacepède, 1801

Peristedion picturatum McCulloch, 1926

Peristedion picturatum McCulloch, 1926: 212-214, pl. LVI, figs 1, 2 and 3. Locality: East of Flinders Island, Bass Strait (Australia) in 70-100 fathoms (= 128-183 m).

Peristedion picturatum: MCCULLOCH, 1929-1930: 396.

MATERIAL EXAMINED. — 12 specimens.
New Caledonia MUSORSTOM 4: stn CC 202, 18°58.0'S, 163°10.5'E, 580 m depth, otter trawl, R. V. "*Vauban*", 20 September 1985: 7 specimens, 151, 152, 152, 149, 142, 144 and 148 mm TL (respectively 136, 135, 133, 127, 130 and 132 mm SL) (MNHN 1995-492).
Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CC 365, 19°42.8'S, 158°48.0'E, 710 m depth, otter trawl, R. V. "*Coriolis* ", 19 October 1996: 2 specimens, 159 and 158 mm TL (respectively 143 and 141 mm SL) (MNHN 1995-493).
Loyalty Islands. MUSORSTOM 6: stn CC 470, 21°04.4'S, 167°33.2'E, 560 m depth, otter trawl, R. V. "*Alis* ", 21 February 1989: 3 specimens, 151, 158 and 148 mm TL (respectively 140, 142 and 132 mm SL) (MNHN 1995-487).

DIAGNOSIS. — Head narrow, sub-rectangular. No spine or a vestigial at lower preopercular angle. Two pairs of ventral scutes before vent. Two pairs of scutes between vent and first anal ray. D_1 VIII; D_2 20-23; A 20-23; P 12-13; GR 21-26.

Source : MNHN, Paris

DISTRIBUTION. — New Caledonia. East of Flinders Island, Bass Strait (Australia) (McCULLOCH, 1926).

REMARKS. — All the specimens examined show two plates between the first anal ray and the vent. The specimens have two plates before the vent although some of them have a furrow-like vertical structure in the posterior ventral plate. This structure may have led some authors to count a third ventral plate, but in our specimens it is only present on one side and it does not articulate with the second ventral plate.

Genus *SATYRICHTHYS* Kaup, 1873

Satyrichthys moluccense (Bleeker, 1851)

Peristedion moluccense Bleeker, 1851: 1: 24. Locality: "Habit. in Banda Neira, in mari (Brandes) ".
Satyrichthys welchi Herre, 1925: 292, pl. 1.

Peristethus moluccense: GÜNTHER, 1880: 42 (citation).
Satyrichthys welchi: KAMOHARA, 1936: 436, 440, pl. 30 fig. 5. — KAMOHARA, 1952: 13. — MILLER, 1974: 65. — GLOERFELT-TARP & KAILOLA, 1984: figs page 119 (partim) and 119. — RIVATON *et al.*, 1990: 100.
Satyrichthys moluccense: MILLER, 1974: 65 (citation). — GLOERFELT-TARP & KAILOLA, 1984: figs page 119 (partim) and 119. — PAXTON *et al.*, 1989: 457.
(?) *Satyrichthys isokawae*: YATOU & OKAMURA *in* OKAMURA *et al*, 1985: 586-589.

MATERIAL EXAMINED. — 2 specimens.
New Caledonia MUSORSTOM 4: stn CP 172, 19°52.9'S, 158°38.6'E, 380-390 m depth, beam trawl, R. V. "*Vauban* ", 17 September 1985: 375 mm TL (332 mm SL) (MNHN 1995-514).
Chersterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 373, 19°52.9'S, 158° 38.6'E, 380-390 m depth, beam trawl, R. V. "*Coriolis*", 20 October 1996: 548 mm TL (487 mm SL) (MNHN 1995-513).

DIAGNOSIS. — Species of Group C as defined by MILLER (1974: 64). Dorsal softrays 17-18, anal rays 17. Two lip barbels. Filamentous barbel very short, hardly reaching first ventral scute. Accessory barbels of filamentous barbel lack any membrane at their junction. Superomedian scutes 33. Gill-rakers on first arch 18-19. Rostral processes large, depressed, strongly convergent and somewhat expanded at tip. D_1 VII; D_2 17-18; A 17; P 14-15; GR 18-19.

DISTRIBUTION. — New Caledonia. Banda Sea (BLEEKER, 1851). Ki Islands (GÜNTHER, 1880). NW shelf, Western Australia (PAXTON *et al.*, 1989). Possibly Philippine Archipelago and adjacent areas (See Remarks).

REMARKS. — Characters given for *S. moluccense* (Bleeker, 1851) or *S. welchi* (Herre, 1925), both included in species Group C of MILLER (1974: 64), apply equally to the other species: dorsal softrays 14 to 18; anal softrays 14 to 18; lip barbels 2 to 3; superomedian scutes 32 to 34.

Satyrichthys orientale (Fowler, 1938)

Nemaperistedion orientale Fowler, 1938: 127-128, fig. 61. Locality: between Gillolo and Makyan Islands (Philippines), 0°16.5'N, 127°30'E, 272 fathoms (= 497 m).

Satyrichthys orientale: MILLER, 1974: 70.
Nemaperistedion orientale: YATOU *in* OKAMURA *et al*, 1985: 594, 595 and 727.

MATERIAL EXAMINED. — 1 specimen.

Source : MNHN, Paris

New Caledonia. MUSORSTOM 4: stn CP 238, 22°13.0S, 167°14.0'E, 500-510 m depth, beam trawl, R. V. "*Vauban*", 2 October 1985: 176 mm TL (154 mm SL) (MNHN 1995-495).

DIAGNOSIS. — 2 + 1 lip barbels and 2 + 1 + 1 chin barbels in each hemimandible. Filamentous barbel very long and reaching vent. Some accessory barbels of the filamentous barbel with a membrane at their base joining them with the filamentous barbel. A long preopercular spine with its posterior tip extending beyond middle of pectoral fin. Without accessory preopercular spine. Rostral processes clearly triangular with broad base. D_1 VII; D_2 21; A 22; P 15; GR 21.

DISTRIBUTION. — New Caledonia. Tosa Bay, East China Sea, Philippines and Indonesia (YATOU *in* OKAMURA *et al.*, 1985).

REMARKS. — As far as we know, only two descriptions of the present species have been published since its original description (MILLER, 1974; YATOU *in* OKAMURA *et al.*, 1985), and these do not agree about its placement in the genus *Nemaperistedion* Fowler, 1938. MILLER (1974: 70) does not recognize it based on the characters used by Fowler, while YATOU (*in* OKAMURA *et al.*, 1985: 595, 727) accepts it without discussion. We agree with MILLER (1974) that the generic characters given by Fowler are not enough to separate *Nemaperistedion* from *Satyrichthys*.

Satyrichthys quadratorostratus (Fourmanoir & Rivaton, 1979) comb. nov.

Peristedion quadratorostratus Fourmanoir & Rivaton, 1979: 423, fig. 15. Locality: South-west off Ile des Pins (New Caledonia) in 360 m.

Peristedion quadratorostratus: RIVATON *et al.*, 1990: 100 (citation).

MATERIAL EXAMINED. — 11 specimens.

New Caledonia. Two syntypes: 124.9 mm TL (109.8 mm SL) (MNHN 1978-478); 121.2 mm TL (109.3 mm SL) (MNHN 1982-1), 17°30'S, 167.30'E, 360 m depth, bottom trawl, date unknown.

BIOCAL: stn CP 42, 22°45.1'S, 167°12.2'E, 380 m depth, beam trawl, R. V. "*Jean Charcot*", 30 August 1985: 1 specimen, 135.2 mm TL (119.1 mm SL) (MNHN 1995-512). — Stn CP 45, 22°47.3'S, 167°14.8'E, 430-465 m depth, beam trawl, 30 August 1985: 1 specimen, 136 mm TL (122.1 mm SL) (MNHN 1995-496). — Stn CP 109, 22°11.9'S, 167°15.9'E, 495-515 m depth, beam trawl, 9 September 1985: 1 specimen, 159 mm TL (142 mm SL) (MNHN 1995-488).

MUSORSTOM 4: stn CP 213, 22°51.3'S, 163°12.0'E, 405-430 m depth, beam trawl, R. V. "*Vauban*", 28 September 1985: 2 specimens, 103.6 and 103.0 mm TL (respectively 89.3 and 90.6 mm SL) (MNHN 1995-491). — Stn CC 245, 22°07.0'S, 167°11.0'E, 415-435 m depth, otter trawl, 3 October 1985: 1 specimen, 167 mm TL (149 mm SL) with a mandibular teratology (MNHN 1995-485).

Norfolk Ridge. CHALCAL 2: stn CP 25, 23°38.6'S, 167°43.1'E, 418 m depth, beam trawl, R. V. "*Coriolis*", 30 August 1986: 1 specimen, 140 mm TL (123.2 mm SL) (MNHN 1995-489).

BERYX 2: stn 31, 23°39.1'S, 167°43.7'E, 430-440 m depth, beam trawl, R. V. "*Alis*", 18 October 1992: 1 specimen, 151 mm TL (133 mm SL) (NMNZ-P.29389). — Stn 32, 23°37.7'S, 167°43.7'E, 420-460 m depth, beam trawl, 18 October 1992: 1 specimen, 148 mm TL (130 mm SL) (NMNZ-P.29290).

DIAGNOSIS. — Head large and spinulous, even in occipital region. Rostral projections long, flat, parallel and slightly divergent anteriorly, being more than 40% of head length (without rostral projections). Filamentous barbel very short and not reaching posterior margin of orbit. Accessory barbels of filamentous barbel without membrane at their junction. Barbels on lower lip 3 (mode) to 4. D_1 VII; D_2 20-22; A 20-22; P 13-16; GR 21-24.

DISTRIBUTION. — Known only from New Caledonia.

Source : MNHN, Paris

REMARKS. — FOURMANOIR & RIVATON (1979: 423) state that the preopercular spine is 1.5 times as long as the eye. This is true when the spine is measured along its outer edge, but in this case, the anterior origin of the spine is rather inaccurate. If the length is taken from the inner axil (at the junction with the opercular flap), the spine is about the same length as that of the orbit.

This species is herein placed in *Satyrichthys*, because it has the diagnostic characters of this genus as defined by KAUP (1873: 82).

Subfamily **TRIGLINAE**

Genus ***LEPIDOTRIGLA*** Günther, 1860

Lepidotrigla* sp. cf. *abyssalis Jordan & Starks, 1904

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. MUSORSTOM 4: stn CC 248, 22°09'S, 167°13.3'E, 435-460 m depth, otter trawl, R. V. "*Vauban*", 4 October 1985: 1 specimen, 170 mm TL (134.6 mm SL) (MNHN 1995-508).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin extending beyond posterior tip of ventral fin for a distance about equal to orbit length. Pectoral fin longer than head length. First free pectoral ray reaching posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. D_1 IX; D_2 15; A 15; P 11 + 3; LL 62; GR 6 + R.

DISTRIBUTION. — New Caledonia. The distribution of *L. abyssalis* is not included because of the provisionnal status of the New Caledonian specimen.

REMARKS. — We have left this New Caledonian specimen as *Lepidotrigla* sp. cf. *abyssalis* because it does not exactly fit with the original description and also because it has been impossible to compare it with the type specimen.

Lepidotrigla alcocki Regan, 1908

Lepidotrigla alcocki Regan, 1908: 240, pl. 28, fig. 4. Locality: Saya de Malha Bank, in over 123 fathoms (= 225 m).

(?) *Lepidotrigla spiroptera* (typogr. error): MATSUBARA & HIYAMA, 1932: 38-41 (description).

(?) *Lepidotrigla spiloptera*: KURONUMA, 1939: 237.

Lepidotrigla alcocki: MATSUBARA & HIYAMA, 1932: 40-41. — RICHARDS & SAKSENA, 1977: 220. — RICHARDS *in* FISCHER & BIANCHI, 1984: TRIGL page 3 and Lepid 4. — RICHARDS, 1992: 46, 52, 54 and 62.

MATERIAL EXAMINED. — 3 specimens.

Saya de Malha Bank. Syntypes of *Lepidotrigla alcocki* Regan, 1908, date unknown, coll. Gardiner, 144.6 mm TL (124.1 mm SL) and 126.8 mm TL (109.4 mm SL) (BMNH 1908.3.23.212-213).

Kai Islands. Holotype of *Lepidotrigla spiloptera* Günther, 1880, date unknown, coll. "*Challenger*", 126.8 mm TL (102.7 mm SL) (BMNH 1879.5.14.269).

Source : MNHN, Paris

Lepidotrigla alcocki vaubani subsp. nov.

Table 1

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. MUSORSTOM 4: stn CP 190, 19°06.3'S, 163°29.5'E, 215 m depth, beam trawl, R. V. *"Vauban"*, 19 September 1985: holotype, 129.6 mm TL (105.5 mm SL) (MNHN 1995-494).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin reaching posterior tip of ventral fin. Pectoral fin smaller than head length. First free pectoral ray not reach ing posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Snout length equal to horizontal length of eye. Breast and interpelvic area naked. Nape and belly scaled. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. D_1 VIII; D_2 16; A 16; P 11 + 3; LL 62; GR 7 + R.

DISTRIBUTION. — New Caledonia.

TABLE 1. — Morphometric (in mm) and meristic variables of the holotype of *Lepidotrigla alcocki vaubani* subsp. nov. (MNHN 1995-494)

MORPHOMETRIC CHARACTERS	
Total length	129.6
Standard length	105.5
Head length	34.9
Length of rostral processes	2.6
Pre-orbital length	13.2
Orbital length	13.2
Interorbital length	6.1
Post-orbital length	11.8
Maxillary length	11.6
Cheek height	11.3
Pre-D_1 length	34.0
D_1 base length	19.1
Pre-D_2 length	56.2
D_2 base length	33.0
Pectoral fin length	32.0
1st free pectoral ray length	27.3
Pre-anal length	58.9
Anal fin base length	34.0
Cleithral spine: post-operc. length	6.4
Head height	24.1
MERISTIC CHARACTERS	
D_1 spines	8
D_2 rays	16
Anal rays	16
Pectoral rays	11
Gill-rakers	7 + 2R
Lateral line scales	62

Source : MNHN, Paris

REMARKS. — This specimen shares a number of characters with *L. spiloptera* and *L. alcocki*. Its rostral processes resemble those illustrated by MATSUBARA & HIYAMA (1932: fig. 14) and KURONUMA (1939: fig. 4A) for *L. spiloptera*, but their identifications have been questioned (RICHARDS & SAKSENA, 1977). In the table presented by MATSUBARA & HIYAMA (1932: 41) to differentiate *L. alcocki* from *L. spiloptera*, the New Caledonian specimen fits with point 1 for *L. spiloptera*, points 2, 3 and 4 for *L. alcocki*, and is not in agreement with the values given for any of the two species for point 5. The napes of the type specimens of *L. spiloptera* and *L. alcocki* are scaly, although described as scaleless by RICHARDS & SAKSENA (1977). The nape of the New Caledonian specimen is scaled. In the type specimens of *L. spiloptera* and *L. alcocki*, the preorbital lengths are longer than the orbit length, whereas their lengths are equal in the New Caledonian specimen. Despite a number a characters in common with *L. spiloptera* and *L. alcocki*, the New Caledonian specimen is distinguished by a number of slight differences, and this is why we have chosen to describe it as a new subspecies rather than as a new species.

Lepidotrigla annamarae sp. nov.

Fig. 1, Table 2

MATERIAL EXAMINED. — 6 specimens.

New Caledonia. MUSORSTOM 4: stn CP 170, 18°57'S, 163°12.6'E, 485 m depth, beam trawl, R. V. "*Vauban*", 17 September 1985: 2 paratypes, 195 mm TL (157 mm SL) (MNHN 1994-317), 160 mm TL (128.4 mm SL) (IPB-6/1994) — Stn CC 202, 18°58'S, 163° 10.5'E, 580 m depth, otter trawl (shrimps), 20 September 1985: 2 paratypes, 201 mm TL (161 mm SL) (MNHN 1994-318), 183 mm TL (148 mm SL) (IIPB-164/1994). — Stn CC 245, 22°07'S, 167°11'E, 415-435 m depth, otter trawl (shrimps), 3 October 1985: holotype, 207 mm TL (170 mm SL) (MNHN 1994-316) and paratype, 131.3 mm TL (104.7 mm SL) (IIPB-168/1994).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin reaching posterior tip of ventral fin. Pectoral fin long, equal or greater than head length and reaching beyond origin of anal fin for a distance equal to orbit length. First free pectoral ray not reaching posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Pelvic fin well developed extending beyond vent and reaching level between bases of second and third anal rays. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. Nape scaled. D_1 IX; D_2 16; A 16; P 11 + 3; LL 55-64; GR 6-8 + R.

DESCRIPTION. — The body is slender and covered with large but poorly attached scales, ctenoid above the lateral line and cycloid below it. The lateral line has 63 branched scales in the holotype (55-64 in the paratypes), and divided when it enters in the caudal fin. The throat, chest and breast are scaleless but the belly is scaled. The holotype has 24 bucklers (24-25 in the paratypes) along both sides of the dorsal fins, the anteriormost being low and increasing their height posteriorly.

The head is relatively long, 3 times in SL in the holotype (2.8-3.2 in the paratypes), with striated bones and a post-ocular groove behind the eyes, but not meeting in the middle of the head. The nape is scaled. The snout is long, 2.6 in HL in the holotype (2.6-2.9 in the paratypes) and slightly descending in front of the orbit. The rostral projections are short, with 4 spines in the holotype (4 to 5 in the paratypes), the second from the outer edge being the longest. The orbit is large and impinging in the upper profile of the head, its horizontal length being 3.3 times in HL in the holotype (3.1-3.4 in the paratypes), 1.3 in PO in the holotype (1.1-1.3 in the paratypes) and always less than the cheek height. The interorbital space is concave, 4.9 in HL in the holotype (4.3-4.9 in the paratypes) and greater than half the length of the orbit. The maxillary reaches to below the anterior edge of the orbit and is about the same length as the orbit, 3.2 in HL (2.5-2.9 in the paratypes). The teeth on both jaws are villiform, absent on vomer and palatines (only two of the paratypes have teeth on the vomer). The gill-rakers on the first arch are 7 in number plus three rudiments (6-8 plus two or four rudiments in the paratypes) and slender in shape. Pseudobranchials are present. A rudimentary barbel or papilla is present on each side of the mandibular symphysis.

The first dorsal fin has nine spines and, when depressed, the fin reaches the origin of the second dorsal fin. The first three dorsal spines are serrated in the holotype (character shared with all the paratypes except one which has

Source : MNHN, Paris

the third spine smooth), the third being the longest and contained 1.9 times in HL in the holotype (1.7-2 in the paratypes). The second dorsal fin has 16 soft rays. The anal fin has 16 soft rays, its origin is below that of the second dorsal fin. The pectoral fin has 11 joined plus 3 free rays, being long and reaching beyond the origin of the anal fin a distance equal to the orbit length, 2.5 times in SL in the holotype (2.0-2.9 in the paratypes), 0.8 in HL in the holotype (0.5-0.9 in the paratypes). The longer free pectoral ray reaches the tip of the longest ray of the pelvic fin. The pelvic fin is well developed with one spine and five rays, extending beyond the vent and reaching between the bases of the second and third anal rays, 4.3 in SL in the holotype (4.3-4.7 in the paratypes). Caudal fin slightly emarginate.

TABLE 2. — Morphometric (in mm) and meristic variables of the specimens of *Lepidotrigla annamarae* sp. nov.

	MNHN 1994-316	MNHN 1994-318	MNHN 1994-317	IIPB 164/1994	IIPB 6/1994	IIPB 168/1994
MORPHOMETRIC CHARACTERS						
Total length	207.0	201.0	195.0	183.0	160.0	131.3
Standard length	170.0	161.0	157.0	148.0	128.4	104.7
Head length	56.7	53.1	51.6	46.1	43.5	37.1
Length of rostral processes	4.5	2.7	2.9	3.9	2.6	2.1
Pre-orbital length	21.7	18.3	19.3	16.6	16.5	13.9
Orbital length	17.2	17.0	15.9	13.6	13.3	10.8
Interorbital length	11.7	12.3	11.4	10.6	9.4	7.6
Post-orbital length	18.3	18.2	17.2	15.5	13.4	11.9
Maxillary length	17.9	19.4	18.0	18.7	15.6	13.6
Cheek height	20.5	19.6	20.7	17.5	15.2	12.8
Pre-D_1 length	55.2	54.2	53.7	46.5	43.4	35.1
D_1 base length	34.2	32.5	30.9	32.1	23.1	21.7
Pre-D_2 length	96.6	88.2	92.0	77.4	71.6	59.1
D_2 base length	55.1	50.4	50.1	48.8	39.8	32.1
Pectoral fin length	56.0	58.5	55.0	49.6	43.4	38.1
1st free pectoral ray length	41.7	37.3	39.4	35.0	32.3	26.9
Pre-anal length	97.1	90.5	38.8	78.9	70.1	58.3
Anal fin base length	52.4	51.9	50.7	47.8	41.2	34.3
Cleithral spine: post-opercular length	14.0	16.9	14.4	14.3	11.0	9.7
Head height	38.0	37.6	35.3	30.8	28.6	24.3
MERISTIC CHARACTERS						
D_1 spines	9	9	9	9	9	9
D_2 rays	16	16	16	16	16	16
Anal rays	16	16	16	16	16	16
Pectoral rays	11	11	11	11	11	11
Gill-rakers	1R+7+2R	2R+6+2R	8	7+2R	7+2R	7+2R
Pre-ocular spines	2	2	2	3	3	2
Post-ocular spines	3	1	1	2	3	2
Sphenotic spine	absent	absent	absent	absent	absent	present
Parietal spine	absent	absent	present	absent	absent	present
Pre-opercular spine	absent	absent	absent	present	absent	ansent
Lateral line scales	63	62	55	63	60	64
Dorsal bucklers	24	24	25	24	24	24
Teeth on vomer	absent	absent	absent	present	absent	present

Source : MNHN, Paris

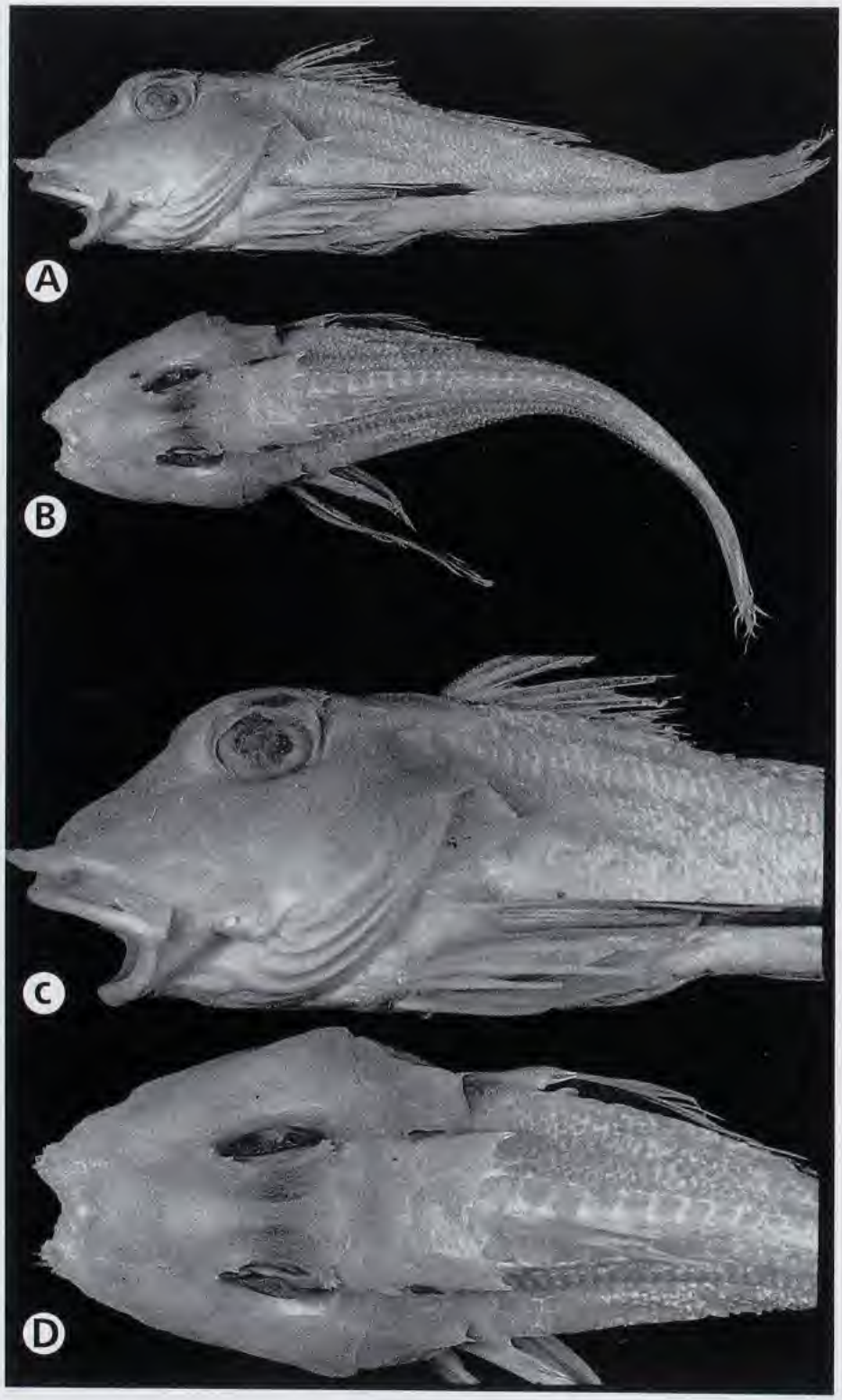

FIG. 1. — Holotype of *Lepidotrigla annamarae* sp. nov. (MNHN 1994-316). — **A**: Lateral view. — **B**: Dorsal view. — **C**: Lateral detail of head. — **D**: Dorsal detail of head.

Source : MNHN, Paris

Spinulation. The cleithral spine is long and stout, reaching to the vertical of the fourth dorsal spine, 4.1 times in HL measured posteriorly to opercle in the holotype (3.0-3.8 in the paratypes). The opercular spine is small but conspicuous, not reaching the posterior tip of the opercular flap. Preopercular spine absent (except for one paratype which is very small), a soft preopercular keel present. Two preocular spines present (2 to 3 in the paratypes), three post-ocular spines present (1 to 3 in the paratypes), sphenotic spine absent (one spine present in one paratype) and one nuchal spine present.

Coloration (in alcohol). The general coloration is pale pink above, whitish below. The head has the same coloration as the body. There are no traces of any markings anywhere. The pectoral fin is blackish on the inner side which is also visible on the outer side, with the uppermost and lowermost rays whitish. Free pectoral rays and other fins yellowish pale.

ETYMOLOGY. — This species is named for the seventh birthday of Annamar, the older daughter of Lluís del Cerro.

DISTRIBUTION. — Known only from New Caledonia.

Lepidotrigla grandis Ogilby, 1910

Lepidotrigla grandis Ogilby, 1910: 122-123. Locality: off Cape Moreton, Queensland, Australia.

Lepidotrigla grandis: MARSHALL, 1964: 438-439 (citation). — GLOEFELT-TARP & KAILOLA, 1984: 117. — PAXTON *et al.*, 1989: 455. — RICHARDS, 1992: 54, 62 (tables).
?*Lepidotrigla spiloptera*: WHITLEY, 1958: 46-47.

MATERIAL EXAMINED. — 1 specimen.
New Caledonia. BIOCAL: stn CP 105, 21°30.7'S, 166°21.7'E, 330-335 m depth, beam trawl, R. V. "*Jean Charcot*", 8 September 1985: 1 specimen, 133.2 mm TL (108.9 mm SL) (MNHN 1995-509).

DIAGNOSIS. — (Diagnosis based on New Caledonian material and literature data). Post-ocular groove complete. Pectoral fin extending beyond posterior tip of ventral fin. Pectoral fin less than head length. First free pectoral ray extending beyond posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Pelvic fin extending beyond vent and reaching second anal ray. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. Nape scaled. D_1 IX; D_2 15; A 15; P 11 + 3; LL 61; GR 8 + R.

DISTRIBUTION. — New Caledonia. Off Cape Moreton, Queensland, Australia (OGILBY, 1910). NE Australia (GLOERFELT-TARP & KAILOLA, 1984). Off Darwin, Northern Territory (130°03'E) and off Brisbane, Queensland (26°30'S) to off Port Stephens, New South Wales (32°S), tropical Australia (PAXTON *et al.*, 1989).

Lepidotrigla musorstom sp. nov.

Fig. 2, Table 3

MATERIAL EXAMINED. — 23 specimens.
New Caledonia. MUSORSTOM 4: stn CC 173, 19°02.5'S, 163°18.8'E, 250-290 m depth, otter trawl (shrimps), R. V. "*Vauban* ", 17 September 1995: 1 paratype, 131.2 mm TL (106.6 mm SL) (USNM 329339).
Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 268, 24°44.7'S, 159°39.2'E, 280 m depth, beam trawl, R. V. "*Coriolis* ", 9 October 1986: 1 paratype, 145.9 mm TL (119.0 mm SL) (USNM 329338). — Stn CP 269, 24°47'S, 159°37.3'E, 250-270 m depth, beam trawl, 9 October 1986: 1 paratype, 157.0 mm TL (121.5 mm SL) (MNHN 1995-497). — Stn CP 275, 24°46.6'S, 159°40.3'E, 285 m depth, beam trawl, 9 October 1986: 1 paratype, 147.8 mm TL (118.8 mm S) (NSMT-P.45842). — Stn CP 309, 22°10.2'S, 159°22.8'E, 340 m depth, beam trawl, 12 October 1986: 2 paratypes, 162 mm TL (125.2 mm SL) (USNM 329337), 144.4 mm TL (115.6 mm SL) (NSMT-P.45840). — Stn CP 312, 22°17.2'S, 159°24.8'E, 315-

Source : MNHN, Paris

TABLE 3. — Morphometric (in mm) and meristic variables of the specimens of *Lepidotrigla musorstom* sp. nov.

	MNHN 1994-26	AMS I.34571 -002	IIPB 3/1994	NSMT P.45841	BMNH 1994. 5.17.1-2	IIPB 2/1994	USNM 329337	IZUA PM.1739	BMNH 1994. 5.17.3	MNHN 1994-27	BMNH 1994. 5.17.1-2
MORPHOMETRIC CHARACTERS											
Total length	148.0	167.0	166.0	155.0	161.0	157.0	162.0	159.0	156.0	154.0	157.0
Standard length	116.6	131.4	130.7	128.3	128.1	127.1	125.2	124.8	123.7	123.2	121.8
Head length	36.0	40.6	42.0	38.4	40.5	41.1	42.2	39.3	40.7	37.1	38.3
Length of rostral processes	2.0	2.3	3.0	2.4	2.2	3.0	2.5	2.6	3.0	2.3	2.6
Pre-orbital length	12.4	14.7	15.1	11.8	13.5	12.8	15.6	12.8	14.9	13.1	12.9
Orbital length	11.1	14.8	14.5	14.3	14.2	14.2	13.6	13.8	13.7	13.3	13.5
Interorbital length	6.4	7.4	6.9	8.1	7.7	7.2	6.9	7.1	7.5	7.0	6.6
Post-orbital length	11.8	13.5	14.7	12.0	13.1	12.9	13.2	13.3	12.5	11.3	12.8
Maxillary length	12.9	14.8	13.1	15.2	12.2	13.1	17.0	13.6	14.6	13.3	12.7
Cheek height	11.9	14.5	14.0	12.3	12.6	13.9	13.4	13.4	13.4	13.4	13.4
Pre-D_1 length	35.8	39.9	43.1	37.5	40.1	40.2	40.6	41.1	39.8	38.3	37.7
D_1 base length	25.2	28.3	29.7	28.1	27.4	24.0	30.6	26.1	29.8	26.6	25.1
Pre-D_2 length	61.7	70.7	71.6	67.4	69.0	66.5	68.1	68.2	67.3	68.3	65.3
D_2 base length	40.0	42.5	39.8	40.4	38.7	38.4	42.9	38.2	37.5	37.4	36.8
Pectoral fin length	47.5	51.2	49.2	51.8	51.0	46.7	53.8	47.3	48.3	48.2	46.2
1st free pectoral ray length	25.6	29.7	30.0	29.1	27.8	26.4	29.1	28.2	27.9	25.7	30.7
Pre-anal length	61.8	73.6	74.4	67.8	70.1	71.9	65.4	72.2	66.9	70.6	69.9
Anal fin base length	40.4	43.3	43.7	42.9	41.5	40.4	43.1	40.4	40.9	39.7	39.7
Cleithral spine: post-opercular length	8.0	9.3	11.4	10.8	8.8	8.0	9.4	10.8	12.2	11.6	8.5
Head height	23.9	28.9	27.8	28.0	27.1	28.2	28.8	26.9	26.9	26.6	26.5
MERISTIC CHARACTERS											
D_1 spines	9	9	10	9	9	9	9	9	9	9	9
D_2 rays	16	16	16	16	15	16	16	15	16	16	15
Anal rays	16	17	16	16	16	16	16	16	16	16	15
Pectoral rays	11	11	11	11	11	11	11	11	11	11	11
Gill-rakers	8+2R	8+2R	7+1R	9+1R	1R+7+2R	7+2R	8+2R	1R+7+2R	1R+6+3R	8+1R	1R+8+1R
Pre-ocular spines	2	2	2	3	2	2	2	5	1	2	2
Post-ocular spines	1	2	2	2	1	2	2	2	1	2	2
Sphenotic spine	present	absent	present	absent	absent	absent	absent	present	present	present	absent
Pterotic spine	absent	present	absent	present	absent	present	present	absent	present	absent	present
Parietal spine	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absnet
Pre-opercular spine	absent	absent	absent	absent	absent	absent	absent	present	absent	present	absent
Lateral line scales	64	63	63	64	61	64	63	63	63	63	63
Dorsal bucklers	24	25	23	24	23	24	24	24	24	23	23
Nape scales	present	present	present	present	present	present	present	present	present	present	present
Teeth on vomer	absent	absent	absent	absent	absent	absent	absent	present	absent	absent	present
Papillae at mandibular symphysis	absent	present	absent	present	present	present	present	absent	present	absent	present

Source : MNHN, Paris

	MNHN 1994-29	USNM 329338	NSMT P.45842	MNHN 1994-28	NSMT P.45840	AMS I.34571 -001	IIPB 4/1994	AMS I.34571 -003	USNM 329339	IZUA PM.1740	IZUA PM.1741
MORPHOMETRIC CHARACTERS											
Total length	155.0	145.9	147.8	143.3	144.4	145.0	146.0	134.8	131.2	130.0	104.1
Standard length	121.2	119.0	118.8	115.8	115.6	114.4	112.8	106.9	106.6	101.7	79.3
Head length	37.9	38.0	36.9	39.3	34.9	36.4	34.6	32.2	34.3	31.7	26.3
Length of rostral processes	1.6	1.7	2.0	2.6	2.0	2.0	3.0	2.7	1.9	2.3	1.4
Pre-orbital length	13.3	13.2	13.0	12.6	11.4	13.7	10.8	12.4	9.9	10.9	9.4
Orbital length	12.9	12.9	12.0	13.8	12.6	10.9	13.1	10.3	10.8	10.3	8.6
Interorbital length	7.0	6.5	7.2	7.4	7.1	6.4	6.6	5.7	6.4	6.3	4.1
Post-orbital length	12.5	10.9	11.4	11.7	12.0	11.1	11.2	10.5	11.9	10.1	8.2
Maxillary length	15.0	11.1	11.2	12.8	12.9	11.9	13.9	11.5	14.6	10.6	9.7
Cheek height	13.3	12.6	11.7	11.8	12.3	11.7	11.2	11.2	12.9	10.5	8.8
Pre-D_1 length	38.5	35.9	34.3	36.2	38.6	35.4	36.7	32.9	31.5	31.0	27.5
D_1 base length	29.9	25.7	25.5	28.4	29.7	24.6	26.0	21.4	23.5	22.9	17.2
Pre-D_2 length	62.1	65.8	61.1	62.4	59.1	60.8	58.7	54.8	57.6	53.2	46.4
D_2 base length	39.5	38.4	37.6	39.0	42.0	36.4	37.6	34.5	35.4	34.6	23.8
Pectoral fin length	47.7	42.4	47.1	47.1	49.3	49.8	50.8	45.9	37.2	46.5	38.8
1st free pectoral ray length	26.1	26.1	25.7	30.5	26.9	25.5	25.5	22.3	26.6	22.5	20.3
Pre-anal length	65.0	63.5	64.6	58.9	59.6	62.1	57.7	58.0	57.5	54.5	44.9
Anal fin base length	39.7	40.0	39.4	38.9	41.9	37.4	37.0	36.2	34.5	35.1	25.2
Cleithral spine: post-opercular length	8.5	11.3	9.1	11.0	8.9	7.2	10.1	8.9	7.5	8.8	5.7
Head height	26.5	25.6	23.3	26.4	25.5	23.4	24.2	22.2	23.8	21.1	16.2
MERISTIC CHARACTERS											
D_1 spines	9	9	9	9	9	9	9	9	9	9	9
D_2 rays	16	16	15	16	16	15	15	16	16	16	16
Anal rays	16	16	16	16	16	16	15	16	16	16	16
Pectoral rays	11	10	11	11	11	11	11	11	11	11	11
Gill-rakers	7+2R	7+2R	9+1R	7+1R	1R+7+2R	7+1R	6+2R	7+1R	7+2R	7+2R	7+1R
Pre-ocular spines	2	2	3	2	2	2	2	2	2	2	2
Post-ocular spines	2	2	3	1	2	2	3	2	2	1	1
Sphenotic spine	absent	absent	absent	present	absent	absent	present	absent	absent	present	present
Pterotic spine	absent	present	present	absent	present	present	absent	present	present	absent	absent
Parietal spine	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
Pre-opercular spine	present	absent	absent	absent	present	present	present	absent	absent	present	present
Lateral line scales	65	64	63	63	65	61	64	66	61	64	61
Dorsal bucklers	23	24	23	23	25	23	22	23	24	24	24
Nape scales	present	present	absent	present	present	present	present	present	present	present	present
Teeth on vomer	present	absent	absent	absent	absent	present	absent	absent	absent	absent	absent
Papillae at mandibular symphysis	present	absent	present	present	present	absent	present	present	present	absent	absent

Source : MNHN, Paris

320 m depth, beam trawl, 12 October 1986: holotype, 148 mm TL (116.6 mm SL) (MNHN 1994-26) and 5 paratypes, 166 mm TL (130.7 mm SL) (IIPB-3/1994), 155 mm TL (121.2 mm SL) (MNHN 1994.29), 154 mm TL (123.2 mm SL) (MNHN 1994.27), 146 mm TL (112.8 mm SL) (IIPB-4/1994), 143.3 mm TL (115.8 mm SL) (MNHN 1994.28). — Stn CP 316, 22°25.1'S, 159°24.0'E, 330 m depth, beam trawl, 13 October 1986: 2 paratypes, 161 and 157 mm TL (respectively 128.1 and 121.8 mm SL) (BMNH 1994.5.17.1-2). — Stn CP 318, 22°26.5'S, 159°21.3'E, 330 m depth, beam trawl, 13 October 1986: 4 paratypes, 159 mm TL (124.8 mm SL) (IZUA-PM.1739), 156 mm TL (123.7 mm SL) (BMNH 1994.5.17.3), 130 mm TL (101.7 mm SL) (IZUA-PM.1740) and 104.1 mm TL (79.3 mm SL) (IZUA-PM.1741). — Stn CP 319, 22°24.4'S, 159°16.5'E, 320-325 m depth, beam trawl, 13 October 1986: 4 paratypes, 167 mm TL (131.4 mm SL) (AMS I.34571-002), 157 mm TL (127.1 mm SL) (IIPB-2/1994), 145.1 mm TL (114.4 mm SL) (AMS I.34571-001) and 134.8 mm TL (106.9 mm SL) (AMS I.34571-003). — Stn CP 320, 22°25.4'S, 159°12.6'E, 315 m depth, beam trawl, 13 October 1986: 1 paratype, 155 mm TL (128.3 mm SL) (NSMT-P.45841).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin extending beyond posterior tip of ventral fin for a distance equal to orbit length. Pectoral fin long, greater than head length and extending beyond origin of anal fin by a distance about twice orbit length. First free pectoral ray not reaching posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Pelvic fin well developed with one spine and five rays, extending beyond vent and reaching level between bases of second and third anal rays. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. Nape scaled. D_1 IX-X; D_2 15-16; A 15-17; P 10-11 + 3; LL 61-66; GR 6-9 + R.

DESCRIPTION. — The body is slender and covered with large deciduous scales, ctenoid above the lateral line and cycloid below it. The lateral line has 64 branched scales in the holotype (61-66 in the paratypes), and it is divided on the caudal fin. The throat, chest and breast are scaleless, but the belly is scaled. The holotype has 24 (22-25 in the paratypes) bucklers along both sides of the dorsal fins, the anteriormost being low and increasing in height posteriorly.

The head is relatively long, 3.2 times in SL (2.9-3.3 in the paratypes), with striated bones and a post-ocular groove behind the eyes but not meeting in the middle of the head. The nape is scaled. The snout is long, 2.9 in HL (2.6-3.5 in the paratypes) and slightly descending in front of the orbit. The rostral projections are short, with 4 spines (4 to 5 in the paratypes), the most exterior being the longest and slightly diverging. The orbit is large and impinging in the upper profile of the head, 3.2 in HL (2.6-3.3 in the paratypes), 1.1 in PO (0.8-1.3 in the paratypes) and usually equal or lesser than the cheek height. The interorbital space is concave, 5.6 in HL (4.7-6.4 in the paratypes) and usually somewhat greater than half the length of the orbit. The maxillary reaches to below the anterior edge of the orbit and is about the same length as it, 2.8 in HL (2.3-3.4 in paratypes). Teeth on both jaws are villiform, lacking on the vomer and palatines. Gill-rakers on the first arch are 8 in number plus two rudiments (6 to 9 plus one, two or three rudiments in the paratypes) and slender in shape. Pseudobranchials are present. Without rudimentary barbels or papillae at each side of the mandibular symphysis in the holotype but is absent or present in the paratypes.

The first dorsal fin has nine spines (9-10 in paratypes) and, when depressed, the fin reaches the origin of the second dorsal fin. The first dorsal spine is serrated, the second is granulated and the third is smooth in the holotype, the third being the longest, 1.5 in HL (1.7-2.2 in the paratypes). The second dorsal fin has 16 soft rays (15-16 in the paratypes). The anal fin has 16 soft rays (15-17 in the paratypes) and its origin is below that of the second dorsal fin. The pectoral fin has 11 joined (10-11 in the paratypes) plus 3 free rays, it is long and reaches beyond the origin of the anal fin by a distance about twice the orbit length, 2.5 in SL (2.0-2.9 in paratypes), 0.8 in HL (0.7-0.9 in paratypes). The pelvic fin is well developed with one spine and five rays, reaching between the bases of the second and third anal rays, 4.4 in SL (3.4-5.1 in paratypes). The caudal fin is slightly emarginate.

Spinulation. The cleithral spine is long and stout, reaching to the level of the fourth dorsal spine, 4.5 in HL measured posteriorly to opercle (3.2-5.1 in the paratypes). The opercular spine is small but conspicuous, reaching slightly beyond the posterior tip of the opercular flap. A very small preopercular spine is present but preopercular keel is absent. Two preocular spines present, two post-ocular spines present, one sphenotic and one nuchal spines present.

Source : MNHN, Paris

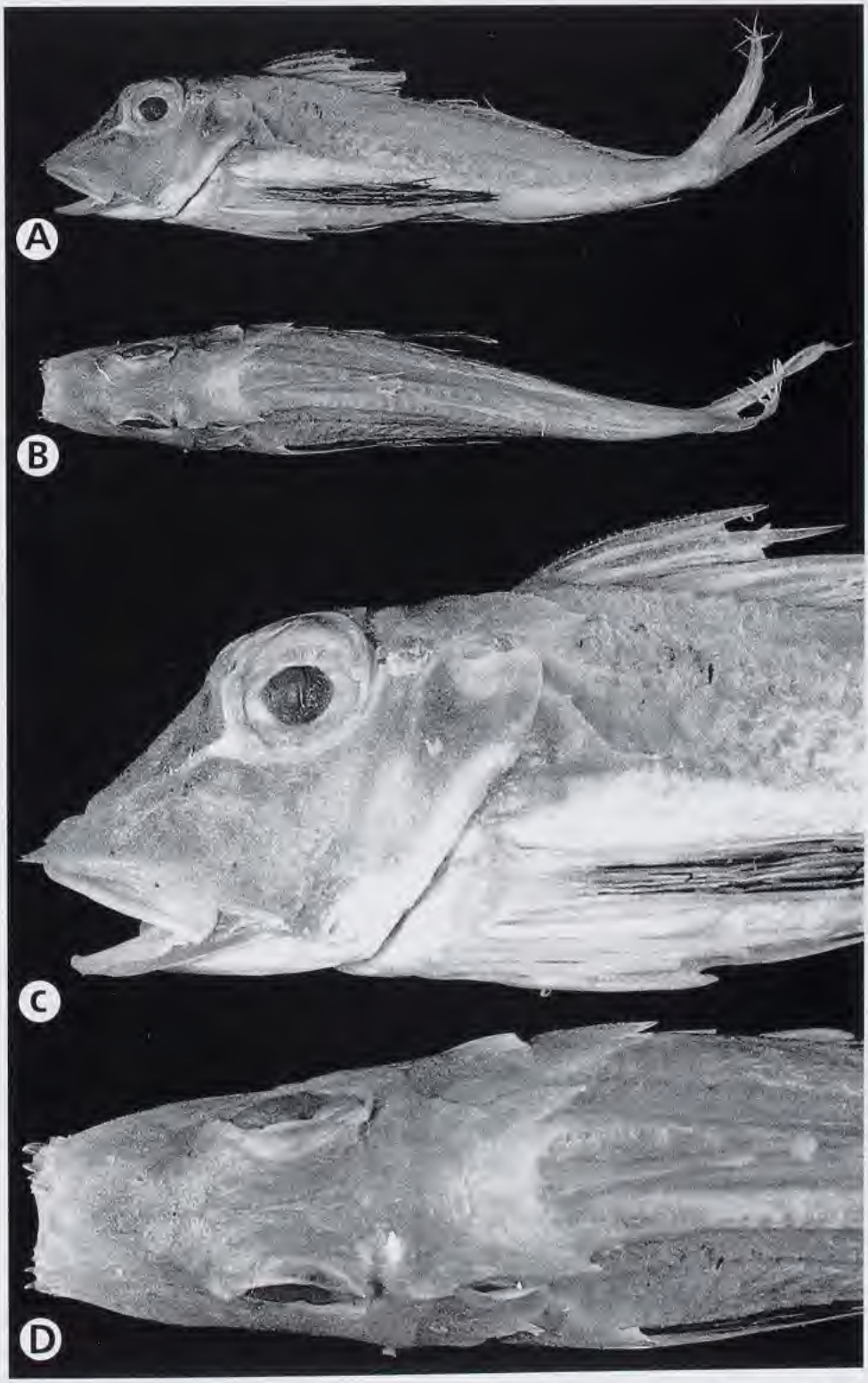

FIG. 2. — Holotype of *Lepidotrigla musorstom* sp. nov. (MNHN 1994-26). — **A**: Lateral view. — **B**: Dorsal view. — **C**: Lateral detail of head. — **D**: Dorsal detail of head.

Source : MNHN, Paris

Coloration (in alcohol). The general coloration is pinky above, silvery white below. The head is brown. There are no traces of any markings anywhere. The pectoral fin is blackish on both sides with the uppermost and lowermost rays whitish. The free pectoral rays and other fins are yellowish pale.

ETYMOLOGY. — This species is named after the acronym used for the series of exploration cruises in the waters of New Caledonia during which the present material was obtained.

DISTRIBUTION. — Known only from New Caledonia.

Lepidotrigla nana sp. nov.

Fig. 3, Table 4

MATERIAL EXAMINED. — 6 specimens.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 351, 19°33.1'S, 158°36.9'E, 290-310 m depth, beam trawl, R. V. "*Coriolis*", 17 October 1986: holotype, 125.6 mm TL (99.8 mm SL) (MNHN 1994-30) and 5 paratypes, 124.1 mm TL (101.4 mm SL) (AMS I.34755-001), 121.7 mm TL (97.9 mm SL) (USNM 329340), 120.9 mm TL (96.1 mm SL) (IIPB-1/1994), 112.7 mm TL (88.7mm SL) (BMNH 1994.5.17.4) and 70.3 mm TL (55.8 mm SL) (MNHN 1994-31).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin extending beyond posterior tip of ventral fin for a distance equal to orbit length. Pectoral fin smaller than head length, reaching eighth rays of anal and soft dorsal fins. First free pectoral ray not reaching posterior tip of pelvic fin. First dorsal fin, when depressed, reaching second dorsal fin. Pelvic fin well developed, extending to beyond vent, reaching base of fourth anal ray (third-fourth ray in paratypes) and somewhat longer than longest free pectoral ray. Pectoral fin blackish. No rostral spine [*sensu* TEAGUE (1951)]. Nape scaled. D_1 IX; D_2 16; A 15-17; P 11+3; LL 59-65; GR 6-7 + R.

DESCRIPTION. — The body is slender, covered with large and deciduous ctenoid scales above the lateral line and cycloid scales below it. The lateral line has 63 branched scales (59-65 in the paratypes), and is divided when it enters the caudal fin. The throat, chest and breast are scaleless. The nape is scaled. The bucklers along both sides of the dorsal fins are 23 in number (23-24 in the paratypes), the anteriormost being low and increasing their height posteriorly.

The head is relatively long, 3.1 times in SL (2.6-3.2 in the paratypes), with striated bones and with a post-ocular groove behind the eyes but does not meet in the middle of the head. The snout is long, 3.0 in HL (3.2-3.8 in the paratypes) and abruptly descending in front of the orbit. The rostral projections are flattened, triangular in shape, clearly separated by a central notch and with two to three conspicuous spines arising from the base. The outer margins or the rostral processes are finely serrated. The orbit is large and well impinging in the upper profile of the head, 3.0 in HL (2.8-3.5 in the paratypes), 1.0 in PO (1.0-1.1 in the paratypes), and almost of the same size of the cheek height. The interorbital space is concave, 5.2 in HL (5.5-6.2 in the paratypes) and somewhat greater than half the length of the orbit. The maxillary is longer than the length of the snout and thus reaches beyond the anterior border of the orbit, 2.3 in HL (2.2-3.5 in the paratypes). Villiform teeth on both jaws, vomer with teeth in the holotype (present or absent in the paratypes) and absent in the palatines. Gill-rakers on first arch are 7 in number plus two rudiments (6 plus two rudiments to 7 with three rudiments in the paratypes) and slender in shape. Pseudobranchials are present. A small rudimentary barbel or papilla present at each side of the mandibular symphysis.

The first dorsal fin has nine spines which, when depressed, barely extend to the origin of the second dorsal fin. The first two spines are serrated, the second being the longest, 1.6 in HL (1.5-1.6 in paratypes) except for one paratype in which the longest is the third (1.6 in HL). The second dorsal fin has 16 soft rays. The anal fin has 16 soft rays (15-17 in paratypes) and its origin is at the same level as that of the second dorsal fin. The pectoral fin has 11 joined plus 3 free rays, it is long and reaches the eighth rays of the anal and soft dorsal fins, 2.60 in SL (2.6-2.8 in paratypes), 0.8 in HL (0.8-1.0 in the paratypes). The pelvic fin is well developed and has one spine and five

Source : MNHN, Paris

rays, extending beyond the vent and reaching to the base of the fourth anal ray (third-fourth in the paratypes), and somewhat longer than the longest free pectoral ray, 4.1 in SL (3.9-4.2 in the paratypes). The caudal fin is slightly emarginated.

Spinulation. The cleithral spine is stout, acute and of moderate size, reaching to the vertical of the fourth dorsal spine, 5.0 in HL measured posteriorly to opercle (3.8-5.0 in the paratypes). The opercular spine is small but conspicuous, reaching slightly beyond the posterior tip of the opercular flap. A very small preopercular spine present (present or absent in the paratypes) but preopercular keel absent. Two preocular, two post-ocular, one sphenotic spine (present or absent in the paratypes), pterotic spine absent (present or absent in the paratypes), parietal spine absent (present or absent in the paratypes) and one nuchal spines.

TABLE 4. — Morphometric (in mm) and meristic variables of the specimens of *Lepidotrigla nana* sp. nov.

	MNHN 1994-30	IIPB 1/1994	AMS I.34755-001	USNM 329340	BMNH 1994.5.17.4	MNHN 1994-31
MORPHOMETRIC CHARACTERS						
Total length	125.6	120.9	124.1	121.7	112.7	70.3
Standard length	99.8	96.1	101.4	97.9	88.7	55.8
Head length	32.0	36.7	31.4	33.0	29.7	19.1
Length of rostral processes	2.9	3.5	3.9	2.9	2.4	1.6
Pre-orbital length	10.8	9.7	9.8	11.1	9.2	5.9
Orbital length	10.8	10.6	10.3	10.4	9.4	6.9
Interorbital length	6.2	5.9	5.7	5.8	5.1	3.4
Post-orbital length	10.5	10.7	10.2	10.8	9.4	6.4
Maxillary length	13.9	10.6	10.9	15.0	11.8	7.8
Cheek height	10.5	10.5	11.3	9.7	9.4	5.7
Pre-D_1 length	30.9	31.6	30.9	31.5	28.9	19.5
D_1 base length	20.6	19.4	17.1	21.0	17.7	11.5
Pre-D_2 length	49.8	51.3	52.5	53.5	47.9	31.0
D_2 base length	35.0	31.7	34.5	32.7	28.1	18.3
Pectoral fin length	38.3	35.0	36.7	36.8	32.7	21.3
1st free pectoral ray length	26.3	24.6	25.2	25.3	22.2	15.9
Pre-anal length	50.5	52.6	54.6	52.6	48.5	30.0
Anal fin base length	33.5	32.7	33.7	31.3	29.2	18.5
Cleithral spine: post-opercular length	6.4	7.4	7.9	7.2	7.9	4.2
Head height	21.7	21.1	20.7	-	19.4	13.0
MERISTIC CHARACTERS						
D_1 spines	9	9	9	9	9	9
D_2 rays	16	16	16	16	16	16
Anal rays	16	16	16	15	16	17
Pectoral rays	11	11	11	11	11	11
Gill-rakers	7+2R	7+2R	7+2R	7+2R	6+2R	7+3R
Sphenotic spine	present	absent	present	present	present	present
Pterotic spine	absent	present	absent	absent	absent	absent
Parietal spine	absent	present	absent	absent	absent	present
Pre-opercular spine	present	absent	present	present	present	present
Lateral line scales	63	64	63	59	64	65
Dorsal bucklers	23	24	24	23	24	24
Teeth on vomer	present	present	absent	absent	present	present

Source : MNHN, Paris

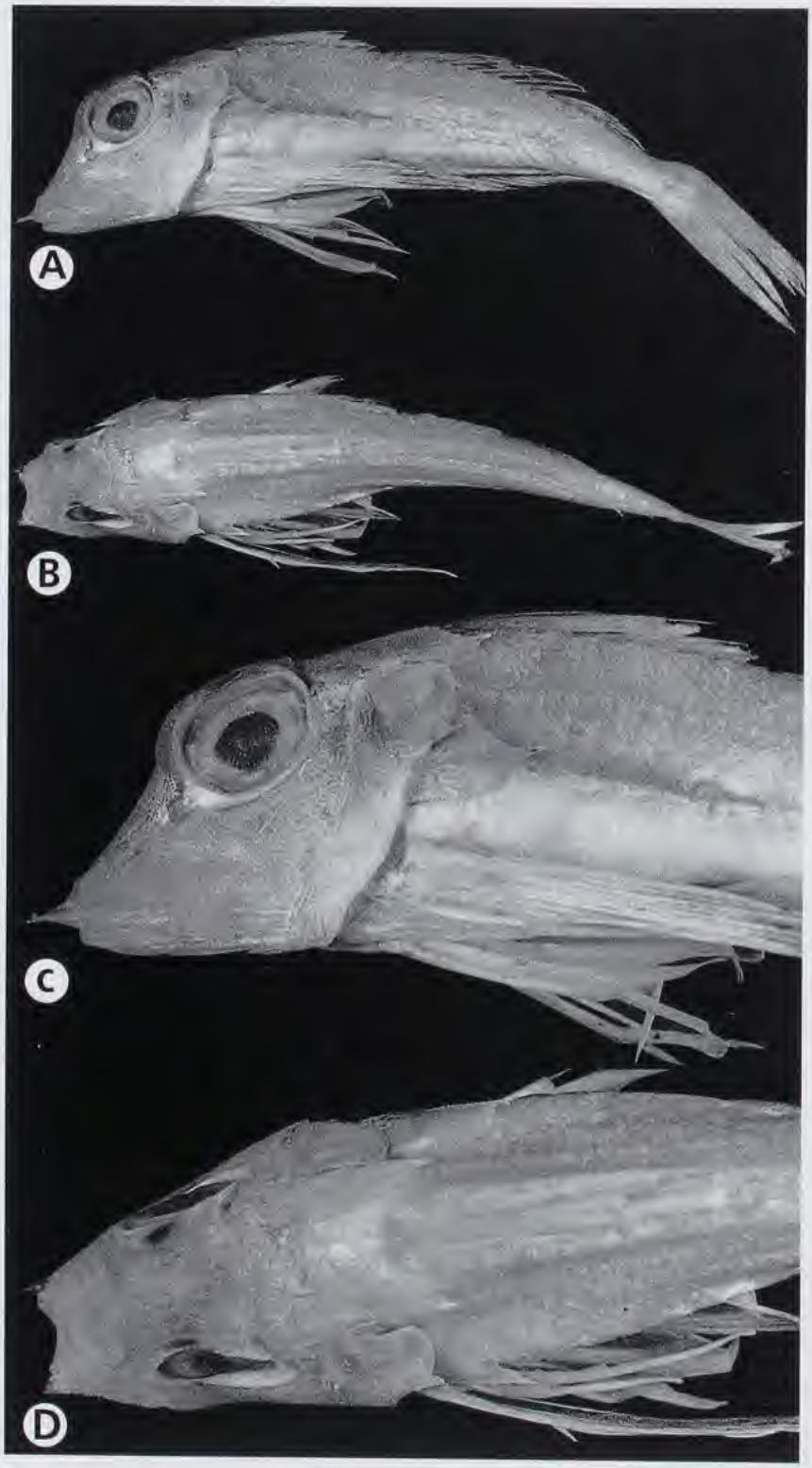

FIG. 3. — Holotype of *Lepidotrigla nana* sp. nov. (MNHN 1994-30). — **A**: Lateral view. — **B**: Dorsal view. — **C**: Lateral detail of head. — **D**: Dorsal detail of head.

Source : MNHN, Paris

Coloration (in alcohol). The general coloration is pale pink-yellowish above, whitish below. The head is somewhat darker than the upper surface of the body. Without traces of any markings anywhere. Upper surface of pectoral fin blackish. Free pectoral rays and other fins pale yellowish.

ETYMOLOGY. — This species is named for its small size, from the Latin *nanus* meaning dwarf.

DISTRIBUTION. — Known only from the type series in the area of New Caledonia.

REMARKS. — This new species is close to *L. argus* Ogilby, 1910, but can be separated from it by the following characters: Pelvic fin 3.5 in SL in *L. argus*, 3.9-4.2 in SL in *L. nana*. Snout 2.25 in HL in *L. argus*, 3.2-3.8 in *L. nana*. Orbit length 3.66 in HL in *L. argus*, 2.8-3.5 in *L. nana*. Interobital distance 4.65 in HL in *L. argus*, 5.2-6.2 in *L. nana*. Also, the shape of the rostral processes is of type "O " for *L. argus* and of type "L " in *L. nana* (*sensu* RICHARDS, 1992).

Lepidotrigla sereti sp. nov.

Fig. 4, Table 5

MATERIAL EXAMINED. — 4 specimens.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CH 271, 24°48.2'S, 159°34.6'E, 250-276 m depth, otter trawl (fishes), R. V. "*Coriolis*", 9 October 1986: 1 paratype, 142.1 mm TL (117.5 mm SL) (BMNH 1994.5.17.5). — Stn CP 276, 24°48.9'S, 159°40.9'E, 258-269 m depth, beam trawl, 9 October 1986: holotype, 135.3 mm TL (110.1 mm SL) (MNHN 1994-32), 2 paratypes, 116.2 mm TL (94.1 mm SL) (IIPB-5/1994) and 113.4 mm TL (88.3 mm SL) (MNHN 1994-33).

DIAGNOSIS. — Post-ocular groove incomplete. Pectoral fin extending beyond posterior tip of ventral fin for a distance equal to orbit length. Pectoral fin long, greater than head length and reaching beyond origin of anal fin by a distance about twice orbit length. First free pectoral ray not reaching posterior tip of ventral fin. First dorsal fin, when depressed, not reaching second dorsal fin. Pelvic fin well developed, extending beyond vent and reaching between bases of second and third anal rays. A conspicuous rostral spine [*sensu* TEAGUE (1951)] present on lateral margin of head, between orbit and rostral processes. Pectoral fin whitish on both sides. Nape scaled. D_1 IX; D_2 15; A 15; P 11-12 + 3; LL 57-64; GR 5-6 + R.

DESCRIPTION. — The body is slender, covered with large and deciduous ctenoid scales above the lateral line and cycloid scales below it. The lateral line has 59 branched scales (57-64 in the paratypes), and is divided on the caudal fin. The throat, chest and breast are scaleless. With 21 bucklers (22-23 in the paratypes) along both sides of the dorsal fins, the anteriormost being low and increasing their height posteriorly.

The head is relatively long, 3.3 times in SL (3.0-3.1 the in paratypes), with striated bones and with a post-ocular groove behind the eyes but not meeting in the middle of the head. The nape is scaled. The snout is long, 2.8 in HL (3.0-3.3 in the paratypes) and abruptly descending in front of the orbit. The rostral projections are short, with a longer central spine, slightly diverging, two small spines in the outer edge of the rostrum and several minute spines in the inner margin. The orbit is large and impinging in the upper profile of the head, 3.1 in HL (2.9-3.1 in the paratypes), 1.1 in PO (0.9-1.0 in the paratypes) and always less than the cheek height. The interorbital space is concave, 5.3 in HL (5.5-5.9 in the paratypes) and nearly half the length of the orbit. The maxillary reaches the anterior edge of the orbit and is about the same length of it, 3.2 in HL (2.8-3.1 in the paratypes). Teeth on both jaws are villiform, lacking on the vomer and the palatines. Gill-rakers on the first arch are 5 in number plus three rudiments (5-6 plus two or three rudiments in the paratypes) and are tubercle-like in shape. Pseudobranchials are present. A small rudimentary barbel or papilla is present at each side of the mandibular symphysis.

The first dorsal fin has nine spines and, when depressed, the fin reaches the origin of the second dorsal fin. The first three spines are serrated, the third being usually the longest, 1.7 in HL (1.7-2.0 in the paratypes). The second dorsal fin has 15 soft rays. The anal fin has 15 soft rays and commences slightly in advance of the origin of the

Source : MNHN, Paris

second dorsal fin. The pectoral fin has 11 joined (11-12 in the paratypes) plus 3 free rays, it is long and reaches beyond the origin of the anal fin by a distance about twice the orbit length, 2.6 in SL (2.6-2.8 in the paratypes), 0.8 in HL (0.9 in the paratypes). The pelvic fin is well developed and has one spine and five rays, extending beyond the vent and reaching between the bases of the second and third anal rays, 5.1 in SL (4.7-5.5 in the paratypes). The caudal fin is slightly emarginated.

Spinulation. The cleithral spine is stout and of moderate size, reaching to the vertical of the fourth dorsal spine, 3.9 in HL measured posteriorly to opercle (5.0-6.4 in the paratypes). The opercular spine is small but conspicuous, reaching slightly beyond the posterior tip of the opercular flap. A very small preopercular spine is present but preopercular keel is absent. One rostral, two preocular (2-3 in the paratypes), two post-ocular, one pterotic and one nuchal spines are present. Parietal spine is absent, except for one paratype.

TABLE 5. — Morphometric (in mm) and meristic variables of the specimens of *Lepidotrigla sereti* sp. nov.

	MNHN 1994-32	BMNH 1994.5.17.5	IIPB 5/1994	MNHN 1994-33
MORPHOMETRIC CHARACTERS				
Total length	135.3	142.1	116.2	113.4
Standard length	110.1	117.5	94.1	88.3
Head length	33.8	37.7	31.8	29.3
Length of rostral processes	3.1	2.7	3.9	1.8
Pre-orbital length	12.1	12.5	9.7	9.6
Orbital length	10.8	12.0	11.0	9.5
Interorbital length	6.4	6.4	5.8	5.0
Post-orbital length	11.0	12.1	10.1	9.5
Maxillary length	10.5	12.5	10.4	10.3
Cheek height	14.2	15.4	12.6	11.8
Pre-D_1 length	32.6	37.3	31.3	29.1
D_1 base length	25.1	24.3	19.5	18.2
Pre-D_2 length	57.0	64.1	51.3	47.2
D_2 base length	38.4	40.4	31.6	28.9
Pectoral fin length	42.3	41.5	35.7	33.7
1st free pectoral ray length	27.6	28.5	27.7	22.6
Pre-anal length	58.2	64.8	50.9	47.3
Anal fin base length	39.2	39.6	33.1	31.6
Cleithral spine post-opercular length	8.7	6.9	6.4	4.6
Head height	25.6	28.2	23.4	21.5
MERISTIC CHARACTERS				
D_1 spines	9	9	9	9
D_2 rays	15	15	15	15
Anal rays	15	15	15	15
Pectoral rays	11	12	11	11
Gill-rakers	1R+5+2R	6+3R	6+2R	5+2R
Pre-ocular spines	2	3	2	2
Parietal spine	absent	absent	absent	1
Lateral line scales	59	64	60	57
Dorsal bucklers	21	23	22	22

Source : MNHN, Paris

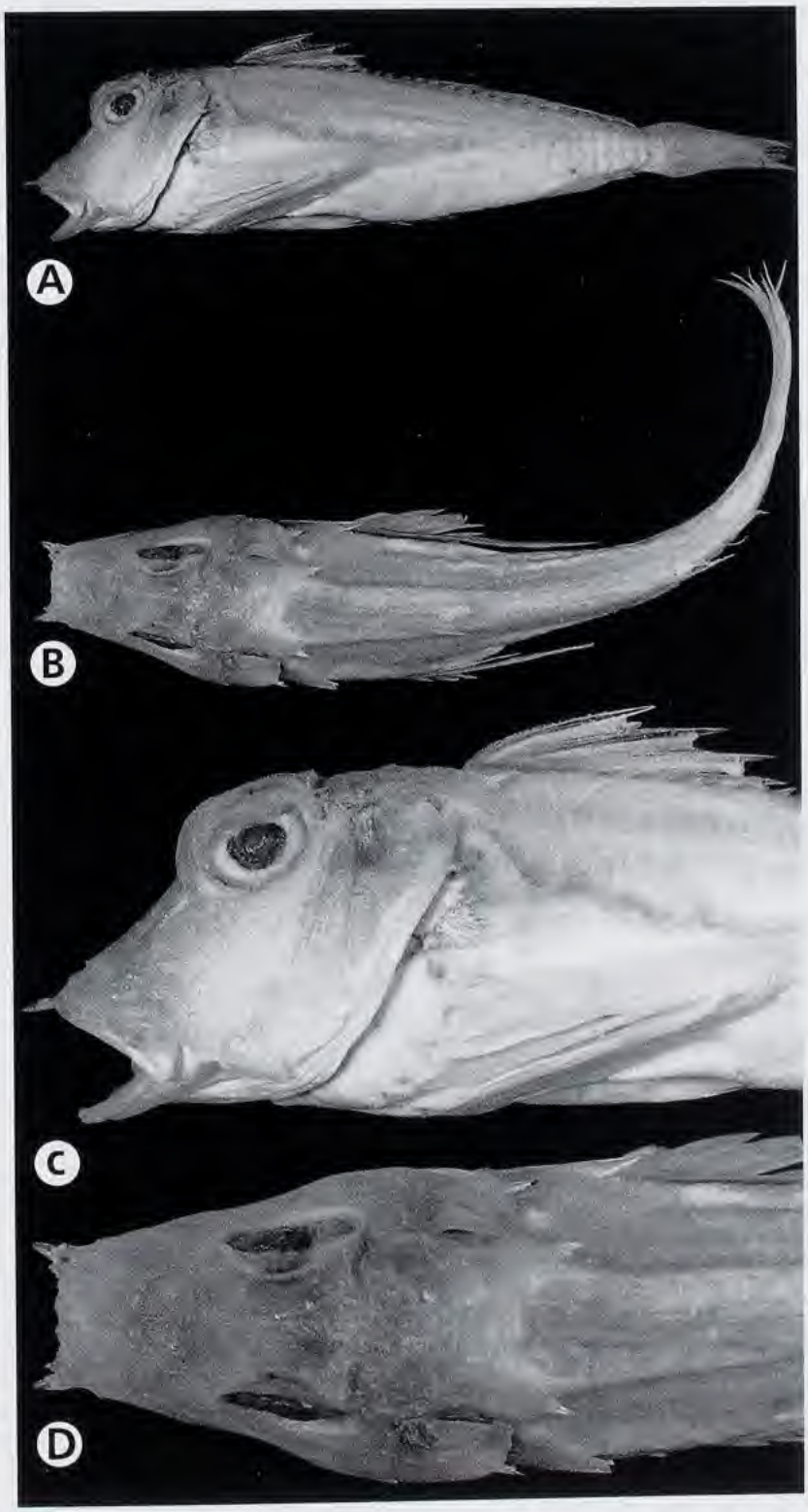

FIG. 4. — Holotype of *Lepidotrigla sereti* sp. nov. (MNHN 1994-32). — **A**: Lateral view. — **B**: Dorsal view. — **C**: Lateral detail of head. — **D**: Dorsal detail of head.

Source : MNHN, Paris

Coloration (in alcohol). The general coloration is pale pink above, whitish below. The head is slightly darker and yellowish. Without traces of any markings anywhere. The pectoral fin is white on both sides. The free pectoral rays and other fins are whitish.

ETYMOLOGY. — This species is named after Dr Bernard SÉRET from ORSTOM (Antenne du Muséum national d'Histoire naturelle, Paris).

Genus *PARAPTERYGOTRIGLA* Matsubara, 1937

Parapterygotrigla megalops (Fowler, 1938) comb. nov.

Dixiphistops megalops Fowler, 1938: 116-117, fig. 55. Locality: San Fernando Point Light, 16°38'N, 119°57.2'E (west coast of Luzon, Philippines), in 186 fathoms (= 340 m).

MATERIAL EXAMINED. — 2 specimens.

New Caledonia. MUSORSTOM 4: stn CC 201, 18°55.8'S, 163°13.8'E, 500 m depth, otter trawl (shrimps), R. V. "*Vauban*", 20 September 1985: 2 specimens, 116.2 and 110.0 mm TL (respectively 94.2 and 86.8 mm SL) (MNHN 1995-510).

DIAGNOSIS. — Pectoral fin short, not extending beyond level of middle of anal fin. Rostral processes slightly divergent and without spine at their base. D_1 VIII-IX; D_2 12; A I + 11; P 13 + 3; LL 54-58; GR 13-15 + R.

DISTRIBUTION. — New Caledonia. Philippines (FOWLER, 1938).

REMARKS. — The data given by FOWLER (1938) in the original description of this species fit perfectly with those of the New Caledonian specimens. The species appears to have never been mentioned in the literature since its original description. It is here placed in *Parapterygotrigla* because the characters given by FOWLER (1938) for the erection of his new monotypic genus *Dixiphistops* are inconsistent.

Parapterygotrigla multiocellata Matsubara, 1937

Parapterygotrigla multiocellata Matsubara, 1937: 266-267, unnumbered figure. Locality: Kumano Nada, south-east to Kii Peninsula (Japan), in about 150 fathoms (= 274 m).

Pterygotrigla multiocellata: KAMOHARA, 1938: 52. — OCHIAI & YATOU *in* MASUDA *et al*, 1984: 334.

Parapterygotrigla multiocellata: KURONUMA, 1939: 254. — YATOU *in* OKAMURA *et al*, 1982: 280-281, 398. — SHEN, 1984: 33. — YATOU *in* OKAMURA *et al*, 1985: 580-581, 724.

MATERIAL EXAMINED. — 2 specimens.

New Caledonia. MUSORSTOM 4: stn CC 173, 19°02.5'S, 163°18.8'E, 250-290 m depth, otter trawl (shrimps), R. V. "*Vauban*", 17 September 1985: 2 specimens, 290 and 160.0 mm TL (respectively 244 and 128.9 mm SL) (MNHN 1995-518).

DIAGNOSIS. — Pectoral fin very long, reaching to or extending beyond posterior end of anal fin. Rostral processes parallel or slightly convergent with a small antrose spine placed on outer part of their base. D_1 VIII; D_2 11; A I + 12; P 12 + 3; LL 59; GR 9 + R.

DISTRIBUTION. — New Caledonia. Japan: Kumano Nada (MATSUBARA, 1937); Kôchi (KAMOHARA, 1938); Kyushu-Palau Ridge and East China Sea (YATOU *in* OKAMURA *et al.*, 1982, 1985); southern Japan to East China Sea (OCHIAI & YATOU *in* MASUDA *et al.*, 1984). Saigon (W.J. RICHARDS, pers. com. 1994).

Source : MNHN, Paris

Genus *PTERYGOTRIGLA* Waite, 1899

Pterygotrigla macrolepidota (Kamohara, 1938)

Uradia macrolepidota Kamohara, 1938: 53, fig. 28. Locality: Urado Market, near Kôchi City (Japan), depth unknown.

Uradia macrolepidota: KURONUMA, 1939: 249 (citation).
Pterygotrigla macrolepidota: OCHIAI & YATOU *in* MASUDA *et al.*, 1984: 334

MATERIAL EXAMINED. — 9 specimens.

New Caledonia. BIOCAL: stn CP 42, 22°45.1'S, 167°12.2'E, 380 m depth, beam trawl, R. V. "*Jean Charcot*", 30 August 1985: 1 specimen, 102.1 mm TL (82.0 mm SL) (MNHN 1995-511).

MUSORSTOM 4: stn CC 173, 19°02.5'S, 163°18.8'E, 250-290 m depth, otter trawl, R. V. "*Vauban*", 17 September 1985: 8 specimens, 132.4, 114.2, 112.7, 100.4, 100.1, 97.3, 95.7 and 93.6 mm TL (respectively 109.4, 91.3, 92.6, 81.5, 80.0, 80.3, 76.8 and 77.6 mm SL) (MNHN 1995-507).

DIAGNOSIS. — The most distinctive feature of this species is the vertically enlarged scales of the lateral line, much higher than long. Posterior tip of pectoral fin not reaching level of middle of the anal fin base. D_1 VIII; D_2 11; A I + 11-12; P 12-13 + 3; LL 54-57; GR 7-9 + R.

DISTRIBUTION. — New Caledonia. Japan: Urado and Mimase Market (KAMOHARA, 1938), Tosa Bay (OCHIAI & YATOU *in* MASUDA *et al.*, 1984).

Pterygotrigla picta (Günther, 1880)

Table 6

Trigla picta Günther, 1880: 24-25, plate XIII, fig. A. Locality: Juan Fernández Island (Chile), depth unknown.
Trigla guttata Philippi, 1896: 375-376.
?*Pterygotrigla andertoni* Waite, 1910: 26.

Trigla guttata: FOWLER, 1945: 113. — DE BUEN, 1959: 48 (citation).
Chelidonichthys pictus: FOWLER, 1945: 114. — MANN, 1954: 54, 79, 309. — DE BUEN, 1959: 48 (citation). — KONG & BOLADOS, 1986: 124.
Pterygotrigla picta: MCCULLOCH, 1929-1930: 393. — HUBBS, 1959: 313-315. — HARDY, 1982: 207-208. — PAXTON *et al.*, 1989: 457. — PAULIN *et al.*, 1989: 170 (key), 259 (citation). — YABE *in* AMAOKA *et al.*, 1990: 238.

MATERIAL EXAMINED. — 9 specimens.

Norfolk Ridge. CHALCAL 2: stn CH 4, 24°44.3'S, 168°09.9'E, 253 m depth, otter trawl (fishes), R. V. "*Coriolis*", 27 October 1986: 2 specimens, 311 and 237 mm TL (respectively 254 and 199 mm SL) (MNHN 1995-517). — Stn CH 5, 24°44.0'S, 168°08.5'E, 223 m depth, otter trawl (fishes), 27 October 1986: 2 specimens, 365 and 275 mm TL (respectively 303 and 226 mm SL) (MNHN 1995-516).

Juan Fernandez Archipelago. Robinson Crusoe Island: 1 specimen, 332 mm TL (274 mm SL) (IZUA PM 1034), 8 February 1985, 40 m depth; 1 specimen, 392 mm TL (320 mm SL) (IZUA PM 1035), 25 April 1985, 100 m depth; 1 specimen, 376 mm TL (308 mm SL) (IZUA PM 1036), 7 February 1985, 60 m depth.

Chile. San Ambrosio Island, 35 m depth, 23 December 1991: 2 specimens, 424 and 367 mm TL (respectively 344 and 298 mm SL) (both IZUA PM 1472).

DIAGNOSIS. — Cleithral spine long and sharp with a wide base. Ppercular spine very long and stout, clearly extending beyond posterior tip of opercular flap. D_1 VII-VIII; D_2 11-12; A I + 11; P 11-12 + 3; LL 61-64; GR 7-8 + R (formula based on specimens from New Caledonia).

Source : MNHN, Paris

DISTRIBUTION. — New Caledonia. Juan Fernández Island, Chile (GÜNTHER, 1880; PHILIPPI, 1896; FOWLER, 1945; MANN, 1954). New Zealand (WAITE, 1910; PAULIN *et al.*, 1989). Great Australian Bight, Bass Strait, New South Wales (MCCULLOCH, 1929-1930).

TABLE 6. — Morphometric (in mm) and meristic variables of the specimens of *Pterygotrigla picta* (Günther, 1880).

	MNHN 1995-517	MNHN 1995-517	MNHN 1995-516	MNHN 1995-516
MORPHOMETRIC CHARACTERS				
Total length	311.0	237.0	365.0	275.0
Standard length	254.0	199.0	303.0	226.0
Head length	82.3	62.2	103.7	77.9
Length of rostral processes	7.6	7.9	3.6	7.8
Pre-orbital length	23.6	22.3	36.8	25.5
Orbital length	30.0	19.7	31.4	24.5
Interorbital length	29.2	20.8	29.4	24.4
Post-orbital length	30.4	21.1	36.4	25.2
Maxillary length	28.7	21.9	43.2	31.4
Cheek height	30.0	21.5	39.1	27.2
Pre-D_1 length	95.2	64.6	113.7	83.5
D_1 base length	49.0	35.0	53.8	41.4
Pre-D_2 length	161.0	112.8	187.0	140.0
D_2 base length	60.1	44.5	68.8	55.7
Pectoral fin length	123.9	104.1	130.5	108.7
1st free pectoral ray length	69.6	47.7	83.1	55.1
Pre-anal length	146.0	113.6	180.0	144.0
Anal fin base length	71.1	52.7	81.6	64.8
Cleithral spine: post-opercular length	33.9	29.5	31.6	29.6
Head height	59.5	39.3	69.7	49.6
MERISTIC CHARACTERS				
D_1 spines	8	7	7	7
D_2 rays	12	11	12	11
Anal rays	1+11	1+11	1+11	1+11
Pectoral rays	12	11+3	12+3	12+3
Gill-rakers	8+6R	8+3R	1R+7+4R	8+3R
Pre-ocular spines	present	present	absent	present
Lateral line scales	61	64	61	64
Dorsal plates	1+9	1+8	1+8	1+8

Source : MNHN, Paris

REMARKS. — The New Caledonian specimens agree with the original description of *P. picta*. However, they differ from specimens collected in Juan Fernández Island in spot pattern, suborbital bony sutures and lower preopercular spine. These differences are provisionally interpreted as intraspecific variations but, considering the considerable geographical distance between New Caledonia and Chile, further studies might elevate the New Caledonian specimens to subspecific rank.

Pterygotrigla robertsi sp. nov.

Fig. 5, Table 7

MATERIAL EXAMINED. — 1 specimen.

Norfolk Ridge. BERYX 11: stn CP 32, 23°37.7'S, 167°43.7'E (Stylaster seamount), 420-460 m depth, beam trawl, R. V. "*Alis*", 18 October 1992: holotype, 183 mm TL (152 mm SL) (MNHN 1994-25).

DIAGNOSIS. — Cleithral spine long and sharp with a wide base. Opercular spine inconspicuous, not extending beyond posterior margin of opercular flap. Pectoral fin extremely long, almost reaching end of last anal fin ray. Snout very long with two nasal spines. D_1 VIII; D_2 12; A 12; P 11 + 3; LL 59; GR 9 + R.

DESCRIPTION. — The body is slender, covered with firmly attached and small cycloid scales; myotomes visible externally. The lateral line has 59 tubular scales. There are nine large bucklers along spinous dorsal base, the first being single and placed in front of the spinous dorsal and eight at both sides of that fin decreasing in size towards the tail. The base of the second dorsal fin has no bucklers.

The head is very long, 2.7 times in SL, smooth and without any kind of post-temporal groove. The nape is scaled. The snout is long, 2.2 times in HL, and as long as the base of the first dorsal fin, straight in profile and descending towards the rostral processes. The rostral projections are short, shorter than orbit length, 5.1 in HL, 1.4 in OL. The orbit is small, high in the head and only slightly impinging in the upper profile, 3.8 in HL, and almost of the same size of the cheek. The interorbital space is slightly concave (4.1 in HL) and nearly as long as the orbit length. The maxillary falls short of the anterior margin of the orbit, 2.7 in HL, 1.2 in PO. The teeth on both jaws are villiform, but the vomer and the palatines are toothless. Gill-rakers on the first arch are long, numbering 9 plus 2 rudiments. Pseudobranchials are present.

The first dorsal fin has eight spines and, when depressed, reaches the origin of the soft dorsal fin. The first three spines are serrated, the second and third being the longest and almost of the same size. The second dorsal fin has 12 soft rays. The anal fin has 12 soft rays and is inserted slightly in front of the second dorsal origin. The pectoral fin has 11 plus three free rays. It is very long and reaches nearly the posterior end of the anal fin (2.1 in SL; 0.8 in HL). The pelvic fin is well developed with one spine and five rays, and its posterior tip extends to the middle of the vent (4.3 in SL). The caudal fin is slightly emarginated.

Spinulation. The cleithral spine is stout and of moderate size, reaching the vertical between the bases of the third and fourth dorsal spines and is slightly shorter than the orbit length (4.1 in HL, measured posteriorly to opercle). The opercular spine is rudimentary, not impinging in the posterior margin of the opercle. The preopercular spine and keel are present and conspicuous, without accessory spines. There is one large nasal spine on each side of the snout behind the nostril, half way to the eye. The nuchal spine is strong, its posterior tip reaching just in front of the first dorsal spine. There are no other spines present on the head.

Coloration (in alcohol). The general coloration is yellowish, the head being slightly darker. The lower flanks (below the cleithral spine) and the ventral side anteriorly to the vent are shadowed. There are traces of dark markings in the first dorsal fin between the first and sixth spines. The pectoral fin is blackish except for the uppermost ray and the three lowermost rays which are pale. The three free rays are also pale as well as the other fins.

ETYMOLOGY. — This species is named after Dr Clive D. ROBERTS, Curator of Fishes at the Museum of New Zealand.

Source : MNHN, Paris

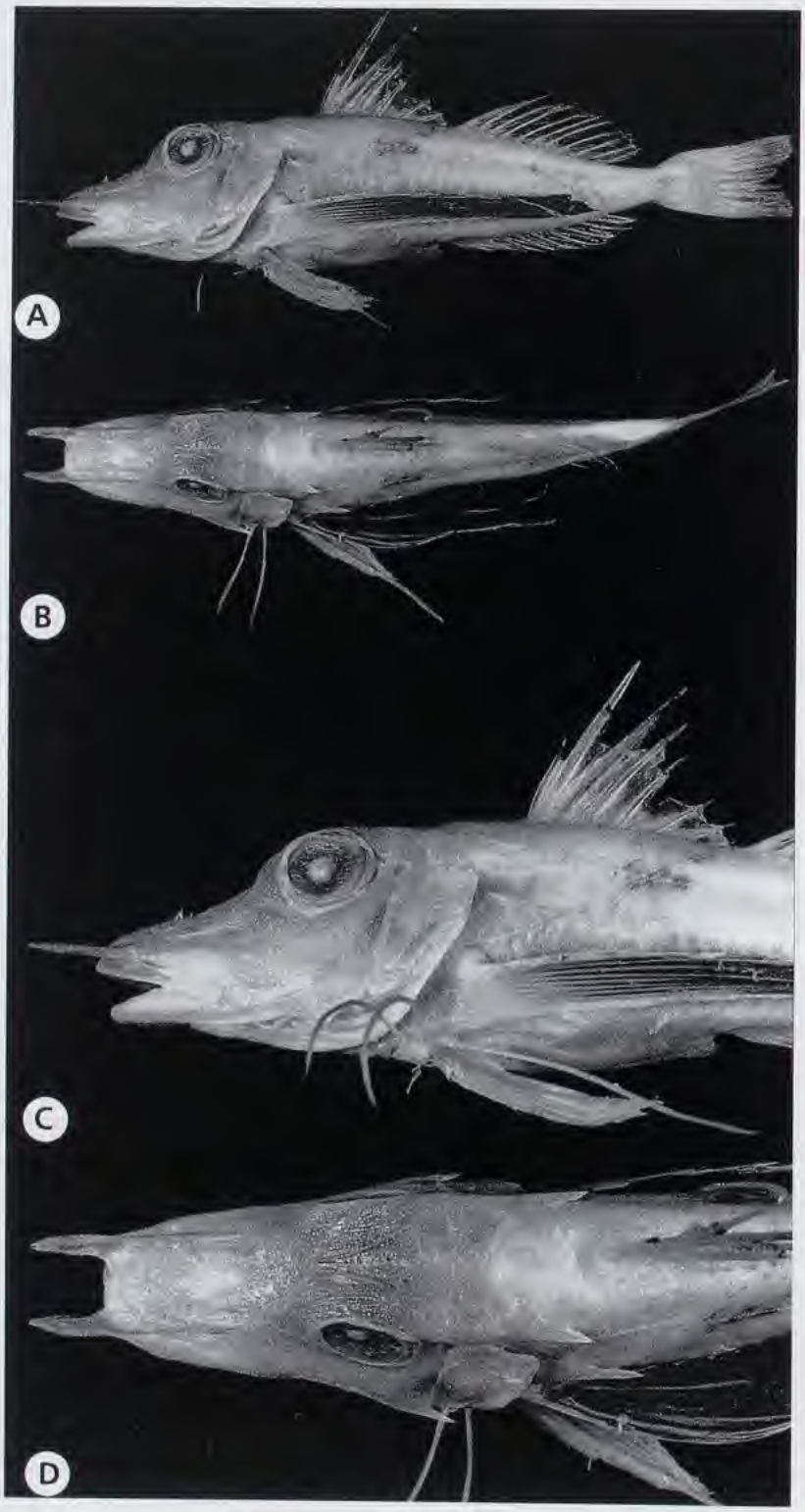

FIG. 5. — Holotype of *Pterygotrigla robertsi* sp. nov. (MNHN 1994-25). — **A**: Lateral view. — **B**: Dorsal view. — **C**: Lateral detail of head. — **D**: Dorsal detail of head.

Source : MNHN, Paris

TABLE 7. — Morphometric (in mm) and meristic variables of the holotype of *Pterygotrigla robertsi* sp. nov. (MNHN 1994-25).

MORPHOMETRIC CHARACTERS	
Total length	183.0
Standard length	152.0
Head length	55.9
Length of rostral processes	10.9
Pre-orbital length	25.1
Orbital length	14.8
Interorbital length	13.8
Post-orbital length	14.2
Maxillary length	20.4
Cheek height	14.5
Pre-D_1 length	63.7
D_1 base length	25.7
Pre-D_2 length	93.0
D_2 base length	36.1
Pectoral fin length	71.1
1st free pectoral ray length	50.5
Pre-anal length	93.8
Anal fin base length	38.4
Cleithral spine: post-opercular length	13.6
Head height	28.8
MERISTIC CHARACTERS	
D_1 spines	8
D_2 rays	12
Anal rays	12
Pectoral rays	11
Gill-rakers	9+2R
Lateral line scales	59

Pterygotrigla tagala (Herre & Kauffman, 1952)

Otohime tagala Herre & Kauffman, 1952: 27-28. Locality: outer Manila Bay, in 64 fathoms (= 117 m).

Pterygotrigla tagala: YATOU & YAMAKAWA, 1983: 217, 220.

MATERIAL EXAMINED. — 32 specimens.

Chesterfield and Bellona Plateaus. CHALCAL 1: stn CH 2, 22°34.4'S, 159°17.4'E, 330 m depth, otter trawl (fishes), R. V. "*Coriolis* ", 28 July 1984: 15 specimens, 134.5 mm TL (108.3 mm SL), 130.8 (106.5), 130.4 (105.9), 128.2 (106.5), 127.7 (105.4), 123.8 (101.5), 123.3 (99.0), 119.0 (96.6), 117.4 (94.3), 115.3 (93.0), 104.3 (85.7), 97.7 (79.09), 96.2 (76.6), 95.0 (78.8) and 90.2 (73.7) (MNHN 1995-505).

MUSORSTOM 5: stn CP 268, 24°44.7'S, 159°39.2'E, 280 m depth, beam trawl, R. V. "*Coriolis*", 9 October 1986: 2 specimens, 116.8 mm TL (95.8 mm SL) and 114.0 (91.6) (MNHN 1995-500). — Stn CH 271, 24°48.2'S, 159°34.6'E, 250-276 m depth, otter trawl (fishes), 9 October 1986: 1 specimen, 121.3 mm TL (97.5 mm SL) (MNHN 1995-501). — Stn CP 275, 24°46.6'S, 159°40.3'E, 285 m depth, beam trawl, 9 October 1986: 1 specimen, 111.6 mm TL (90.0 mm SL) (MNHN 1995-506). — Stn CP 276, 24°48.9'S, 159°40.9'E, 258-269 m depth, beam trawl, 9 October 1986:1 specimen, 117.3 mm TL (94.4 mm

Source : MNHN, Paris

SL). — Stn CP 312, 22°17.2'S, 159°24.8'E, 315-320 m depth, beam trawl, 12 October 1986: 5 specimens, 120.8 mm TL (99.8 mm SL), 116.6 (94.3), 116.2 (94.0), 112.5 (92.8) and 114.0 (92.7) (MNHN 1995-499). — Stn CP 316, 22°25.1'S, 159°24.0'E, 330 m depth, beam trawl, 13 October 1986: 2 specimens, 128.7 mm TL (105.0 mm SL) and 112.9 (93.1) (MNHN 1995-502). — Stn CP 319, 22°24.4'S, 159°16.5'E, 320-325 m depth, beam trawl, 13 October 1986: 2 specimens, 124.9 mm TL (102.2 mm SL) and 107.2 (89.4) (MNHN 1995-504). — Stn CP 351, 19°33.1'S, 158°36.9'E, 290-310 m depth, beam trawl, 17 October 1986: 3 specimens, 136.5 mm TL (108.8 mm SL), 136.1 (109.1) and 126.9 (100.6) (MNHN 1995-503).

DIAGNOSIS. — Cleithral spine absent or very short, reduced to a rounded almost inconspicuous basal plate. D_1 VII-VIII; D_2 12-14; A I + 10-12; P 12-14 + 3; LL 50-62; GR 10-13 + R.

DISTRIBUTION. — New Caledonia. Philippines: outer Manila Bay (HERRE & KAUFFMAN, 1952).

REMARKS. — All New Caledonian specimens have been assigned to *P. tagala* despite slight differences with the original description.

DISCUSSION

In the waters of New Caledonia, the family Triglidae is represented by 6 genera and 18 species. Only one of them, *Pterygotrigla picta* (Günther, 1880), is also found in the waters of New Zealand. The New Caledonian triglid fauna is most closely related to those of Australia and the Philippines.

In his study on the genus *Lepidotrigla*, RICHARDS (1992) defines a distinctive character for his new species *L. jimjoebob*: the presence of small rudimentary barbels on the mandibular symphysis. This character has been included in our descriptions of the New Caledonian specimens, since it has been found in some of the new species described herein. Furthermore, we also have found this character in some *Lepidotrigla* and *Pterygotrigla* species examined as comparative material. However, this character shows intraspecific variation and this is probably why it has been overlooked by several authors.

In this paper a new subspecies has been described: *Lepidotrigla alcocki vaubani*. Another one has been suspected for the New Caledonian specimens of *Pterygotrigla picta*, but was not defined pending further comparative studies.

The present study of the New Caledonian triglids has highlighted a number of taxonomic problems as exposed below.

Peristedion picturatum, which had been synonymized with *Peristedion liorhynchus* (Günther, 1871) by PAXTON *et al.* (1989: 456), can be distinguished by the number of plates between the first anal ray and the vent, 3 in *P. liorhynchus* vs 2 in *P. picturatum*. Furthermore, the ventral surface of the snout of *P. picturatum* is completely smooth and there is a spine on the rostral processes close to the snout; this spine is absent in *P. liorhynchus*. *Peristedion nierstraszi* Weber, 1913, is very similar to *P. liorhynchus* in having three plates and no spine.

Despite its accurate description, *Satyrichthys moluccense* was apparently overlooked by HERRE (1925) when he described the new species *Peristedion welchi*, as well as by GLOERFELT-TARP & KAILOLA (1984). We believe that all records under the name *Satyrichtys welchi* refer to *S. moluccense*, a senior synonym.

In comparing the original descriptions of *Satyrichthys hians* (Gilbert & Cramer, 1897), *Satyrichthys investigatoris* (Alcock, 1898) and *Satyrichthys amiscus* (Jordan & Starks, 1904), we found that these nominal species seem to be closely related, if not synonyms, and also close to *Satyrichthys orientale*. However, pending further investigations of actual specimens and types, we have classified the single New Caledonian specimen as *S. orientale*, because it fits with the original description and that given by YATOU (*in* OKAMURA *et al.*, 1985: 727). MILLER (1974: 7) had already suggested that these nominal species may represent a single one with a broad longitudinal distribution.

Satyrichthys quadratorostratus appears very similar to *S. serrulatum* (Alcock, 1898). We have not seen the type specimens of *S. serrulatum* and there are few references dealing with this species. However, judging from the

Source : MNHN, Paris

very complete description given by YATOU (*in* OKAMURA *et al.*, 1982), it seems to belong to the same species group as *S. quadratorostratus*. They can be separated by the length of rostral processes (longer in *S. quadratorostratus*), the width of rostral processes (narrower in *S. quadratorostratus*), the distance between the inner edges of rostral processes at the premaxillary symphysis (longer in *S. quadratorostratus*), the length of the filamentous barbel (which does not reach the posterior edge of the orbit in *S. quadratorostratus*, but surpasses it in *S. serrulatum*), and finally the number of barbels in the lower lip (fewer in *S. quadratorostratus*). A specimen caught at MUSORSTOM 4 stn CC 245 was identified as *S. quadratorostratus* although it showed a band of villiform teeth on the left superior hemimandible which were missing in the right side. The absence or presence of teeth on the upper mandible being a diagnostic character separating the genera *Paraheminodus* and *Satyrichthys*, the initial question was to determine to which genus this specimen should be assigned. We have considered it a teratologic example of *S. quadratorostratus* rather than a different, unknown species of *Paraheminodus*, because all other characters fitted quite well with the description of *S. quadratorostratus*.

Among the valid species of *Lepidotrigla* listed by RICHARDS (1992), only two show close similarity to *Lepidotrigla sereti*: *L. kanagashira* Kamohara, 1936 and *L. kishinouyei* Snyder, 1911. *L. sereti* is distinguished from *L. kanagashira* mainly by the length of the snout, the interorbital width, the depth of the caudal peduncle, the length of the pectoral fin and of the second dorsal spine (always longer in *L. kanagashira* than in *L. sereti*). *L. sereti* is very similar to *L. kishinouyei* in the shape of the rostral processes as figured by KURONUMA (1939: fig. 8), but it is distinguished, among others, by the length of the snout and the interorbital width which is longer in *L. kishinouyei*. Also, the pectoral fin of *L. sereti* extends beyond the origin of the anal fin on a distance equal to about twice eye diameter. All the specimens of *L. sereti* have pectoral fins totally white, without any other marking. It should be noted that in all other species of *Lepidotrigla* collected during the New Caledonian cruises the fins still retain traces of marks even after a long period of preservation. We have therefore considered this to be a specific diagnostic character, despite we are not certain of the colour of pectoral fins on live fishes.

Trigla guttata has been recorded by MANN (1954: 79, 309) as "pez mariposa común" (common butterfly fish) but his description agrees neither with the original description, nor with that of *Pterygotrigla picta*, a senior synonym. HUBBS (1959) states that the specimen figured by MANN (1954) might well be *Chelidonichthys kumu* (Lesson & Garnot, 1830). However, based on our study of the syntypes of the latter (MNHN 6926 and MNHN 6931), we suggest that the specimen figured by MANN (1954) is most probably *Trigla lyra* Linnaeus, 1758, of the Mediterranean Sea and Atlantic Ocean. Indeed, it shares with *T. lyra* the shape of rostral processes, the size and shape of the cleithral spine, the truncate caudal fin and the lack of spots.

Pterygotrigla robertsi, which is only known from the holotype, uniquely differs from the twelve nominal species currently accepted in the genus *Pterygotrigla* by the presence of large nasal spines and an extremely long pectoral fin. It could also have been assigned to *Parapterygotrigla* on the basis of the presence of rostral processes longer than the orbit diameter. *Parapterygotrigla* is also defined by some authors by the presence of nasal spines. However, we have assigned *P. robertsi* to *Pterygotrigla* because the relative length of the rostral processes to the orbit diameter is usually regarded as the discriminating feature between the two genera, whilst the presence or absence of nasal spines is a disputed generic character.

ACKNOWLEDGMENTS

We are very grateful to Dr Bernard SÉRET who entrusted us with the study of the New Caledonian triglids and loaned material. We are indebted to Dr Guy DUHAMEL (MNHN), Dr Germán PEQUEÑO (IZUA), Dr Clive D. ROBERTS (NMNZ), and Ms Anne-Marie WOOLGER (BMNH) for loans of specimens. A visit to Laboratroire d'Ichtyologie, MNHN, was made possible by an ORSTOM grant to the senior author. We would also like to thank Dr William J. RICHARDS for his comments, and Clive ROBERTS and Nigel MERRETT for linguistic polishing. Mr Joan BIOSCA helped with the figures. This paper has been made possible by DGICYT funds through project ZONAP (PB90-0166).

Source : MNHN, Paris

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Source : MNHN, Paris

7

Gemfishes (Scombroidei, Gempylidae, *Rexea*) of New Caledonia, southwest Pacific Ocean, with description of a new species

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ABSTRACT

Gemfishes of the genus *Rexea* from the New Caledonia Exclusive Economic Zone (EEZ) are reviewed based on fresh and preserved specimens. Three species are recognized: *Rexea antefurcata* Parin, 1989, confirming recent records (previously also recorded as *R. prometheoides*), distinguished by the presence of small scales on the caudal peduncle and extending anteriorly along the edges of the lower lateral line, lateral line branching below the 4th-5th dorsal fin spines, a long pectoral fin, and dusky colour of spinous dorsal fin membrane and (in adults) pectoral fin; *R. bengalensis* (Alcock, 1894), first record, distinguished by its small maximum size, lateral line branching below the 5th-6th dorsal fin spines, long pectoral fin, and naked body (except lateral line); and *R. alisae* sp. nov., endemic, distinguished by 3-4 dorsal finlets and 4 anal finlets, lateral line branching below the 6th to 7th dorsal fin spines, posterior extent of the upper lateral line, its naked body (except lateral line), and coloration. A key to New Caledonian gemfishes (*Rexea* spp., *Rexichthys johnpaxtoni* and *Promethichthys prometheus*) is provided.

ROBERTS, C. D. & A. L. STEWART, 1997. — Gemfishes (Scombroidei, Gempylidae, *Rexea)* of New Caledonia, southwest Pacific Ocean, with description of a new species. *In:* SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 125-141, Paris ISBN 2-85653-500-3.

Source : MNHN, Paris

RÉSUMÉ

Escoliers (Scombroidei, Gempylidae, *Rexea*) de Nouvelle-Calédonie (Océan Pacifique Sud-Ouest) et description d'une nouvelle espèce.

Les escoliers du genre *Rexea* (famille des Gempylidae) capturés dans la zone économique exclusive (ZEE) de Nouvelle-Calédonie sont révisés en se basant sur des spécimens frais et fixés. Trois espèces sont reconnues. La première, *Rexea antefurcata* Parin, 1989 (précédemment identifée comme *R. prometheoides*), est caractérisée par la présence de petites écailles sur le pédoncule caudal qui s'étendent antérieurement le long des bords de la ligne latérale inférieure, la ligne latérale qui se divise sous les 4ème à 5ème épines dorsales, une longue nageoire pectorale, les bords foncés des nageoires dorsale épineuse et pectorale. La seconde, *Rexea bengalensis* (Alcock, 1894) signalée pour la première fois dans la région, se distingue de la précédente par sa petite taille maximale, la présence de la ligne latérale qui se divise sous les 5ème à 6ème épines dorsales, une longue nageoire pectorale, et un corps sans écailles (à l'exception de celles de la ligne latérale). La troisième, *Rexea alisae* sp. nov., endémique, se distingue de la précédente par la présence de 3 à 4 pinnules dorsales et 4 anales, la ligne latérale qui se divise sous les 6ème à 7ème épines dorsales, la ligne latérale supérieure plus courte, un corps sans écailles (à l'exception de celles de la ligne latérale) et une coloration différente. Une clef de détermination intégrant *Rexea* spp., *Rexichthys johnpaxtoni* et *Promethichthys prometheus*, est proposée.

INTRODUCTION

Gempylids are swift, bentho- and mesopelagic predators found at 80-800 m depth in all oceans. Species of *Thyrsites* (snoek) and *Rexea* (gemfishes) may attain large sizes and, due to their local abundance, support important commercial fisheries in the waters off South Africa, Australia, New Zealand, and South America (NAKAMURA & PARIN, 1993). Although common on continental shelves and slopes, some gemfishes are characteristically found on seamounts in the open ocean.

As defined here, gemfishes comprise fishes in the genera *Rexea, Rexichthys* and *Promethichthys*, and are readily diagnosed in the field as gempylids possessing a prominent black blotch on the anterior two or three membranes of the spinous dorsal fin. Gemfishes together with the black snake mackerel, *Nealotus tripes* Johnson, are thought to form a monophyletic group within the family Gempylidae (COLLETTE *et al.*, 1984); characters identified as suggesting close phylogenetic relationship between these fishes include a slightly elongated body, moderate number of vertebrae, the presence of supernumerary finlets on the caudal peduncle, reduction of pelvic fins, and the presence of small fangs on the lower jaw (PARIN, 1990a). Within this group species identification is largely centred on details of lateral line configuration and extent of squamation; overlapping meristic counts coupled with an overall similarity of shape and appearance make gemfish species superficially similar and easy to misidentify. The Indo-Pacific genus *Rexea* includes six species that were revised by PARIN (1989).

ORSTOM exploratory fishing by trawl and longline on seamounts of the northern Norfolk Ridge and other offshore areas of the EEZ has captured significant numbers of gemfishes, and these have been progressively recorded as *Promethichthys prometheus* (BARRO, 1981; ANON., 1988), *Rexea prometheoides* (LABOUTE, 1989; GRANDPERRIN *et al.*, 1990; 1991) and *Rexea antefurcata* (GRANDPERRIN & LEHODEY, 1992; LEHODEY *et al.*, 1993). The main aim of this study, therefore, is to carry out a taxonomic review of these gemfishes in order to identify and diagnose the species present.

METHODS

Counts were taken using the standard methods described by HUBBS & LAGLER (1964); measurements (in a straight line from point to point with calipers) were made following those modified for gempylids by NAKAMURA *et al.* (1983). In addition, length of first dorsal fin base is measured from its origin to the origin of the second

Source : MNHN, Paris

dorsal fin, i.e. to the anterior base of the comprised spine in the fin; bony interorbital width is the bony distance across the neurocranium at mid-orbit (not quite the least bony distance); orbit length is the greatest horizontal distance between the free orbital rims; and caudal peduncle length excludes the anal finlets, i.e. is taken from the insertion of the last anal finlet to the base of the middle caudal rays. Internal characters follow NAKAMURA & PARIN (1993) and were determined from radiographs; specimens X-rayed are denoted by an asterisk in the text. Data for the holotype of *R. alisae* is given in the text description followed by data for paratypes and non-types in parentheses. Standard institutional abbreviations, following LEVITON *et al.* (1985), are used: AMS - Australian Museum, Sydney; MNHN - Muséum National d'Histoire Naturelle, Paris; NMNZ - Museum of New Zealand, Wellington (formerly the National Museum of New Zealand). Other abbreviations are: HL for "head length" and SL for "standard length".

Comparative material examined. —*Rexea brevilineata* Parin, 1989: paratypes, 2 specimens, 212-215 mm SL (AMS-I.27374-001), off Chile. — *Rexea prometheoides* (Bleeker, 1856): 6 specimens, 211-246 mm SL (AMS-I.31147-001), Western Australia; 3 specimens, 214-251 mm SL (AMS-I.31155-007)*, Western Australia. — *Promethichthys prometheus* (Cuvier, 1832): 1 specimen, 249 mm SL (AMS-I.19096-004), New South Wales, Australia. — *Rexichthys johnpaxtoni* Parin and Astakhov, 1987: holotype, 105 mm SL (AMS-I.23899-001), New South Wales, Australia; paratype, 102 mm SL (AMS-I.20444-003), Queensland, Australia.

SYSTEMATIC ACCOUNT

Family **GEMPYLIDAE**

REMARKS. — The scombroid family Gempylidae has long been recognized (REGAN, 1909 and subsequent authors), but its limits and monophyly remain controversial. In their phylogenetic analysis of the Scombroidei, COLLETTE *et al.* (1984: 593) diagnosed the family and recognized six monophyletic groups based on osteological characters. One of these was the "*Nealotus* group" composed of three genera *Nealotus, Promethichthys* and *Rexea*. Also using mainly osteological characters, JOHNSON (1986) carried out a phylogenetic analysis of the Scomboidei, but proposed a hypothesis which differed from that of COLLETTE *et al.* (1984). JOHNSON (1986) showed the Gempylidae of COLLETTE *et al.* to be paraphyletic and rediagnosed the Gempylidae as a monoplyletic group comprising the subfamilies Gempylinae, Trichiurinae and Lepidocybiinae, however, no apomorphies were found with which to define the Gempylinae. The term "gempylids" may, therefore, include trichiurids (following JOHNSON,1986), or exclude trichiurids (following COLLETTE *et al.*, 1984; NAKAMURA & PARIN, 1993; and others). We follow the later more widely accepted use, but recognize that the term gempylines may be more accurate and appropriate.

Genus ***REXEA*** Waite, 1911

Rexea Waite, 1911: 49 (feminine, type species *R. furcata* Waite = *Gempylus solandri* Cuvier by original designation).
Jordanidia Snyder, 1911: 527 (feminine, type species *J. raptoria* Snyder = *Thyrsites prometheoides* Bleeker by original designation).

REMARKS. — *Rexea* has seven species, including one described below as new, three are known from the New Caledonian EEZ. Most closely related to the monotypic genera *Promethichthys* Gill and *Rexichthys* Parin & Astakhov (PARIN, 1989).

Source : MNHN, Paris

Rexea antefurcata Parin, 1989

Long-finned gemfish, Escolier à longues ailes

Figs 1-2, Tables 1-2

Rexea antefurcata Parin, 1989: 19-21, fig. 6, original description, type locality Sala y Gomez Ridge, southeast Pacific Ocean (25°34'S; 89°12'W).

Rexea antefurcata: PARIN, 1990b: 24, listed, Nazca and Sala y Gomez ridges. — PARIN & PAXTON, 1990: fig.b, description, off east coast of Australia. — PARIN, 1991: 681, listed, Nazca and Sala y Gomez ridges. — NAKAMURA & PARIN, 1993: 44, fig. 78, description, subtropical South Pacific Ocean.

Rexea prometheoides : FOURMANOIR & RIVATON, 1979: 424, description, Ile des Pins. — RIVATON *et al.*, 1989: 39, listed, New Caledonia.

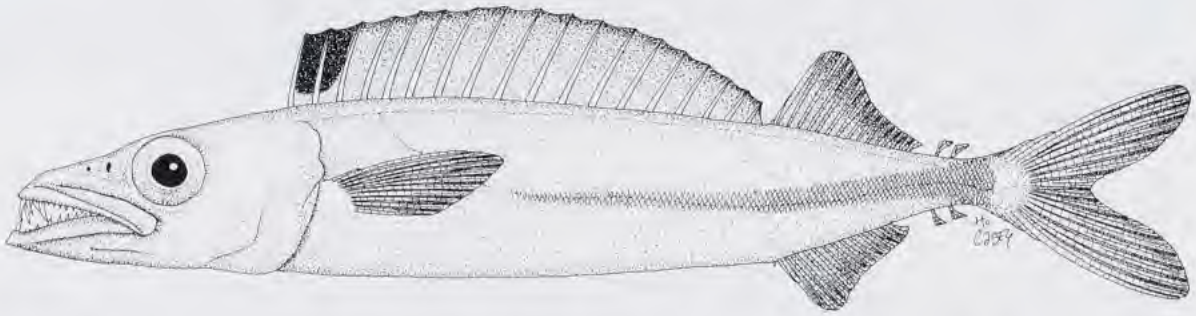

FIG. 1. — *Rexea antefurcata* Parin, 1989, NMNZ-P.29251, 272 mm SL, Stylaster seamount, off New Caledonia, a few damaged fin characters redrawn from specimen NMNZ-P.29272, 262 mm SL. Drawn by Helen Casey.

MATERIAL EXAMINED. — 43 specimens.

Chile. — Paratype, 1 specimen, 315 mm SL (AMS-I.27375-001)*, 24° 03'S, 84° 42'W, 120 m depth, R. V. *"Professor Mesyatsev"*, 14 October 1984.

Norfolk Ridge. — 37 specimens, 128-547 mm SL.

CHALCAL 2: stn CC 3, 23°39.03'S, 167°43.11'E (Stylaster seamount), 424 m depth, otter trawl, R. V. *"Coriolis"*, 30 October 1986: 2 specimens, 234-261 mm SL (MNHN 1995-1064)*.

BERYX 2: stn 1, 24°56.70'S, 168°21.65'E (seamount "B"), 505-585 m depth, otter trawl, R. V. *"Alis"*, 23 October 1991: 2 specimens, 385-505 mm SL (NMNZ-P.27434)*. — Stn 3, 24° 55.15'S; 168°20.95'E (seamount "B"), otter trawl, 600-675 m depth, 24 October 1991: 1 specimen 470 mm SL (NMNZ-P.27425). — Stn 4, 24° 56.10'S, 168°22.03'E (seamount "B"), 600-700 m depth, otter trawl, 24 October 1991: 1 specimen 340 mm SL (NMNZ-P.27440)*. — stn 19, 24°55.80'S, 168°22.30'E (seamount "B"), 550-700 m depth, otter trawl, 30 October 1991: 2 specimens, 321-385 mm SL (NMNZ-P.27486)*,

BERYX 11: stn 3, 24°54.60'S, 168°21.60'E (seamount "B"), 502-610 m depth, otter trawl, R. V. *"Alis"*, 14 October 1992: 3 specimens, 363-560 mm SL (NMNZ-P.29410)*. — Stn 4, 24° 50.75'S; 168°21.86'E (seamount "B"), 550-920 m depth, otter trawl, 14 October 1992: 1 specimen, 394 mm SL (NMNZ-P.29224)*. — Stn 6, 24°57.10'S, 168°21.30'E (seamount "B"), 505-620 m depth, otter trawl, 15 October 1992: 1 specimen, 394 mm SL (NMNZ-P.29369)*. — Stn 26, 24°45.00'S, 168°08.00'E (seamount "A"), 230-260 m depth, otter trawl, 17 October 1992: 6 specimens, 325-395 mm SL (NMNZ-P.29215)*. — Stn 28, 23°38.80'S, 167°43.00'E (Stylaster seamount), 430-490 m depth, otter trawl, 18 October 1992: 7 specimens, 272-374 mm SL (NMNZ-P.29251)*. — Stn 37, 23°38.35'S, 167°40.25'E (Stylaster seamount), 440-500 m depth, otter trawl , 19 October 1992: 3 specimens, 259-319 mm SL (NMNZ-P.29272)*.

Chesterfield and Bellona Plateaus. — MUSORSTOM 5: stn CC 365, 19°42.82'S, 158°48.00'E, 710 m depth, otter trawl, R. V. *"Coriolis"*, 19 October 1986: 2 specimens, 128-136 mm SL (MNHN 1995-1065)*. — Stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m depth, otter trawl, 21 October 1986: 1 specimen, 315 mm SL (MNHN 1995-1066)*.

Australia. — 5 specimens, 326-408 mm SL.

1 specimen, 382 mm SL (AMS-I.29348-001)*, off Greenwell Point, New South Wales (34°53'S, 150°52'E), otter trawl, 1989. — 1 specimen, 341 mm SL (AMS-I.29379-001)*, off Greenwell Point, New South Wales (34°53'S, 150°52'E), otter trawl, 19 September 1989. — 2 specimens, 326-369 mm SL (AMS-I.29380-001)*, N.E. of Sydney, New South Wales (33°0'S,

Source : MNHN, Paris

151°0'E), otter trawl, 16 August 1989. — 1 specimen, 408 mm SL (AMS-I.30012-001)*, 50 km S.E. of Gabo Island, Victoria (37°50'S, 150°10'E), otter trawl, 450 m depth, 5 November 1989.

DIAGNOSIS. — A species of *Rexea* with the following combination of characters: second dorsal fin soft rays 15-17; two dorsal finlets and two anal finlets; two lateral lines, their point of bifurcation below interspace between 4th and 5th dorsal fin spines; small scales present on caudal peduncle and anteriorly along edge of lower lateral line; pectoral fin long, 1.7-2.2 in head length, extending past anterior part of lower lateral line; pelvic spine absent in adults; dorsal fin dark grey, distal three-quarters of anterior two interspinous membranes black; pectoral fin dusky in adults; pyloric caeca 8-9.

TABLE 1. — Frequency distributions of selected characters of *Rexea antefurcata* Parin, 1989, taken off New Caledonia, Australia (Tasman Sea) and Chile (type locality). Counts from left and right sides of same specimen given where available.

Location	New Caledonia		Australia		Australia	Chile
Data source	This study		This study		Parin (1989)	Parin (1989)
Tubed scales in lateral line anterior to branch						
	Left	Right	Left	Right		
9-10	2	1	-	-	1	11
11-12	7	16	1	1	13	46
13-14	22	14	3	4	30	33
15-16	4	3	1	-	5	2
17-18	-	-	-	-	1	-
Spines in 1st dorsal fin						
18	36		5		27	43
19	1		-		1	-
Soft rays in 2nd dorsal fin						
14	4		1		-	-
15	28		3		6	9
16	5		-		20	30
17	-		-		2	4
Soft rays in anal fin						
12	4		-		1	3
13	27		3		24	30
14	6		2		3	10
Pectoral fin rays						
13	-		1		2	-
14	36		4		54	56
15	1		-		-	-

DESCRIPTION. — Frequency distributions of selected meristic characters are given in Table 1. Dorsal fin spines 18-19+1-2 (modally 18 + 2) (penultimate spine small), dorsal fin rays 15-17 (modally 15), two dorsal finlets; anal fin spines 1+1 (first spine small and separate, second larger, comprised with fin), anal fin rays 12-14 (modally 13), two anal finlets; pectoral fin rays 14-15 (modally 14, first ray simple and small); principal caudal fin rays 1+15+1,

Source : MNHN, Paris

dorsal and ventral procurrent caudal fin rays 8/8 (1-6 very small); upper jaw with 3-5 fixed and 0-3 depressible large fangs, lower jaw with 14-18 smaller compressed fangs, palatine teeth present; tubed scales in lateral line 109-115 (in four largest specimens examined); one gill raker on first arch at angle, remainder sinescent; pyloric caeca 8 (14) or 9 (7) (mode 8, n = 21); vertebrae 20+14 = 34; epineurals present on vertebrae 1 to 30; dorsal fin and anal fin pterygiophores bisegmental; the two dorsal finlet pterygiophores and the two anal finlet pterygiophores trisegmental; an elongate s-shaped bony stay posterior to last dorsal middle element and last anal middle element.

TABLE 2. — Selected measurements expressed as % standard length from specimens of *Rexea antefurcata* Parin, 1989, taken off New Caledonia, Australia (Tasman Sea) and Chile (type locality).

	New Caledonia This study n = 37	Australia This study n = 5	Chile Paratype AMS I-27375-001	Chile Parin (1989) n = 28
Standard Length (mm)	128-547	326-408	315	109-720
Head length	29.1-32.0	29.1-31.6	29.1	28.6-32.4
Snout length	11.1-12.8	11.5-12.6	11.5	11.0-12.5
Upper jaw length	13.2-15.2	13.0-14.9	13.0	13.0-14.5
Orbit length	6.9-10.6	7.0-8.5	7.0	6.0-7.0
Postorbital head length	10.0-12.6	11.1-11.9	11.1	10.7-12.8
Interorbital width	5.2-8.8	5.7-7.8	5.7	3.9-5.3
Bony interorbital width	2.9-4.8	4.1-5.0	4.1	(3.9-5.3)
Body depth	14.0-19.8	14.0-17.3	14.6	13.8-19.5
Pectoral fin length	13.8-18.1	16.6-18.9	16.6	11.4-17.3
1st predorsal length	26.9-30.1	26.0-29.3	26.0	25.6-29.0
2nd predorsal length	75.5-79.0	75.5-78.5	77.1	73.8-78.5
Preanus length	70.5-75.7	72.0-74.6	74.6	74.2-79.1
Caudal peduncle length	5.1-9.3	6.7-8.1	6.7	6.3-8.0
Caudal peduncle depth	3.4-6.1	3.9-4.6	3.9	3.5-4.5
Longest dorsal spine length	6.4-10.6	8.4-10.4	9.6	8.7-11.1
Longest dorsal ray length	8.2-10.0	9.4-9.8	9.8	8.3-12.0
Longest anal ray length	6.8-8.8	7.8-8.8	8.2	7.9-10.6
Length of 1st dorsal fin base	47.7-52.3	46.8-51.3	51.1	47.7-52.6
Length of 2nd dorsal fin base	15.7-18.9	16.2-19.1	16.4	15.2-18.1
Length of anal fin base	14.8-17.1	15.4-16.4	16.4	14.9-18.3

Selected morphometric data, summarized as minimum-maximum % SL, are given in Table 2. Greatest body depth 5.1-7.1 in SL. Lateral line branching below interspace between 4th-5th dorsal fin spines; upper lateral line following profile of back, extending to below last ray of second dorsal fin-2nd dorsal finlet; lower lateral line undulating mediolaterally, crossing caudal peduncle to caudal fin origin. Head length 3.1-3.4 in SL; fleshy orbit length 3.5-4.5 in HL. Snout length 2.5-2.7 in HL, its dorsal profile slightly concave; maxilla extending to below anterior margin of pupil; lower jaw prognathous. First dorsal fin originating on a vertical just before upper angle of operculum, anterior 12 spines subequal in length; second dorsal fin short based, 2.6-3.2 in base of first dorsal fin, its 2nd ray longest being just shorter than longest dorsal spine length; dorsal finlets not connected by membrane to membrane to base of last ray of second dorsal fin. Anal fin origin below origin of second dorsal fin, its base equal in length to base of second dorsal fin, 1st anal ray longest, anal finlets not connected by membrane to base of last

Source : MNHN, Paris

anal ray. Caudal fin deeply forked. Pectoral fin long, 1.7-2.2 in HL, extending to below base of 7th-9th dorsal spine and reaching past anterior part of lower lateral line; pelvic fins absent in adults.

Coloration (when fresh). Head and body metallic silver, darker dorsally; pupil silvery-yellow with brownish ring medially; dorsal fin dark grey with black margin and black blotch on anterior two interspinous membranes, pectoral fin dusky with broad blackish margin, second dorsal and anal fins pale grey, caudal fin dark grey.

Coloration (in preservative). Head and body uniform dark tan, opercle margin blackish; pupil silvery-yellow with broken dark ring; dorsal fin dark brown-grey with dark margin and black blotch on anterior two interspinous membranes, pectoral fin dusky with a broad dark margin (pale in juveniles 128-136 mm SL), remaining fins dusky.

DISTRIBUTION. — Subtropical South Pacific Ocean: benthopelagic at 80-800 m depth, occuring on seamounts of the Nazca and Sala y Gomez Ridges, off Easter Island, southern Fiji, northern New Zealand, on seamounts in the Tasman Sea, off east coast of Australia (PARIN, 1989 fig. 5; NAKAMURA & PARIN, 1993 fig. 79), and now verified for the New Caledonian region, being recorded from off the Bellona Plateau and seamounts "A", "B" , Aztèque, Jumeau ouest, Jumeau est, and Stylaster, at 230-920 m depth (GRANDPERRIN & LEHODEY, 1992: 31; GRANDPERRIN *et al.*, 1992a: 23; GRANDPERRIN *et al.*, 1992b: 31; GRANDPERRIN *et al.*, 1992c: 23; LEHODEY *et al.*, 1992a: 27; LEHODEY *et al.*, 1992b: 25; LEHODEY *et al.*, 1992c: 27; LEHODEY *et al.*, 1992d: 19-20; LEHODEY *et al.*, 1993: 74-79; this study).

REMARKS. — Prior to our identification of *Rexea antefurcata* in catches made during cruise BERYX 2 (GRANDPERRIN & LEHODEY, 1992), the gemfish commonly captured during exploratory fishing on the southeastern seamounts of New Caledonia was routinely listed in cruise reports as *R. prometheoides*, viz.: LABOUTE (1989: 15, listed, major by-catch on southern seamounts); GRANDPERRIN *et al.* (1990: 17-19, listed, several specimens on seamounts Jumeaux and Stylaster, and south of Ile des Pins), GRANDPERRIN *et al.* (1991: 27-28, listed, 224 specimens, 19% of biomass, main bycatch on seamounts "B" and "D"). *Rexea prometheoides* has an Indo-West Pacific distribution and is known from northern Australian waters (NAKAMURA & PARIN, 1993: 48-49) and may occur in New Caledonian waters, but its presence off New Caledonia has yet to be verified. Based on our identifications of ORSTOM and NMNZ specimens, it is concluded, therefore, that most records of *"R. prometheoides"* from the southeastern New Caledonian seamounts should be referred to *R. antefurcata*.

During ORSTOM cruise BERYX 11, *Rexea antefurca* was caught by otter trawls but not by small, slow moving beam trawls and Waren dredges (LEHODEY *et al.*, 1993; pers. obs. CDR) which these agile fishes were presumably well able to avoid.

Data from over 12 meristic and 20 morphometric characters were collected during this study from 37 New Caledonian specimens, five Australian specimens, and one paratype, and compared with data presented by PARIN (1989) from 28 to 92 specimens (depending on the character) from the type locality off Chile and 50 specimens off Australia (Tables 1 & 2). In general, character variation is remarkably similar between populations, justifying the recognition of *R. antefurcata* from New Caledonia. There are, however, a few meristic and morphometric characters which appear to be different in New Caledonian specimens, and which warrant further comment.

Meristics. PARIN (1989: 109, Table 3) could only find one character differing between samples of *R. antefurcata* from the southeast and the southwest Pacific: the branching point of the lateral line which he found located slightly posteriad in specimens from the Tasman Sea, giving a similar range but modally different counts of tubular scales anterior to the lateral line fork (mode 11-12, S.E. Pacific vs mode 13-14, S.W. Pacific). On the basis of this difference, PARIN (1989) suggested it is possible that the Tasman Sea population should be taxonomically segregated. Counts of this character made during our study (Table 1) show a similar variation in mode, but between counts taken on the left sides (mode 13-14) and counts taken on the right sides (mode 11-12) of New Caledonian specimens. Thus, these differences in modal counts of tubed scales anterior to the lateral line branch are simply due to intraspecific variation, and do not justify taxonomic recognition.

Considerable confusion over the number of spines in the second dorsal fin has existed since the establishment of the genus by WAITE (1911) who originally described the fin as having two spines. Subsequent descriptions have varied from two unbranched rays (LINDBERG & KRASYUKOVA, 1989), one spine (MATSUBARA & IWAI, 1952; MACHIDA, 1985), and one or two spines (NAKAMURA, 1984; 1986; LAST *et al.*, 1983; MAY & MAXWELL, 1985;

Source : MNHN, Paris

GLOERFELT-TARP & KAILOLA, 1984). In his review of the genus, PARIN (1989) stated in the generic diagnosis that the first two rays of the second dorsal fin were unbranched, and that the anal fin had one free spine and one unbranched ray. The family review by NAKAMURA & PARIN (1993) modified this diagnosis to one second dorsal fin spine, and one free and one comprised spine in the anal fin.

Study of radiographs of 43 New Caledonian, Australian, and Chilean specimens (including a paratype, see materials examined) has shown that in the usual state for *R. antefurcata* the second dorsal fin has two small spines: one small free spine that often just protrudes through the skin, and one larger "comprised" spine closely abutting with the first soft ray (Fig. 2). Only one specimen (NMNZ-P.27440, 340 mm SL) possesses one spine, and this is more or less intermediate in size to the small free spine and the larger comprised spines of the other specimens examined. Our exclusion of the larger comprised spine from the soft ray count of the second dorsal fin explains why the counts are consistently one less than those of PARIN (1989) and NAKAMURA & PARIN (1993) (Table 1). After adjustment of PARIN's (1989) data for direct comparison with our data, counts of the second dorsal fin soft rays from the East Pacific and Australian populations give frequency distributions which agree closely - Chile: 14 (9), 15 (30), 16 (4); Australia: 14 (6), 15 (20), 16 (2); vs New Caledonia: 14 (4), 15 (28), 16 (5) (cf. Table 1).

FIG. 2. — Configurations of second dorsal fin anterior spinous and soft rays of *Rexea antefurcata* Parin, 1989. — **A**: Paratype, Chile, AMS-I.27375-001, 315 mm SL, two spines anteriorly. — **B**: New Caledonia, NMNZ-P.29272, 319 mm SL, two spines anteriorly. — C: New Caledonia, NMNZ-P.27440, 340 mm SL, one spine anteriorly. Spines black, rays white, pterygiophores stippled. Drawn by Helen Casey from radiographs.

Morphometrics. In his world revision of *Rexea*, PARIN (1989) cited NAKAMURA *et al.* (1983) as the source for his methods of measurements, but his precise methods of measuring "interorbital distance" and "eye diameter" as translated from the Russian are not clear.

Two interorbital measurements were taken during the present study: interorbital width, the least measurement between the uppermost point on the fleshy margin of the orbits (NAKAMURA *et al.*, 1983); and bony interorbital width, the bony distance across the neurocranium at mid-orbit (HUBBS & LAGLER, 1964). There is considerable difference between these two measurements (e.g., "fleshy" interorbital width 5.2-8.8 %SL, bony interorbital width 2.9-4.8 %SL) (Table 2). Comparison of our "fleshy" interorbital width measurements with data for "interorbital distance" taken by PARIN (1989, Table 1) differ (5.2-8.8 %SL vs 3.9-5.3 %SL) (Table 2). Our data included a paratype with 5.7 %SL measured by PARIN but outside his range, therefore the methods of measurement must be different. Comparison of bony interorbital width shows better agreement between our data and PARIN's (2.9-5.0 %SL vs 3.9-5.3 %SL) (Table 2), including the paratype with 4.1 %SL which falls within both sets of data as should be expected. Therefore, it is concluded that the difference between "interorbital width" and "interorbital distance" is due to different methods of measurement. Comparison of bony interorbital width between samples shows reasonably good agreement.

PARIN (1989) did not distinguish which orbit measurements he used for "eye diameter" - orbit length: "greatest distance between free orbital rims", or the smaller eye length "greatest distance between margins of eye-ball" (NAKAMURA *et al.*, 1983: 408). Neither measurement is easy to make precisely, particularly in specimens that have

Source : MNHN, Paris

received both trawl and baritrauma damage. Comparison between our orbit length data and PARIN's eye diameter data (6.9-10.6 %SL vs 6.0-7.0 %SL, paratype 7.0 %SL) (Table 2) suggests that PARIN used the smaller measurement of eye length, and therefore these data are not directly comparable.

In summary, all characters which show apparent differences between populations of *Rexea antefurcata* recognized here can be accounted for by intraspecific variation and differences in methods of measurement and counting techniques used by different investigators.

Rexea alisae sp. nov.
Alis gemfish, Escolier de l'Alis
Fig. 3, Table 3

Rexea sp. cf. *bengalensis*: LEHODEY *et al.*, 1993: 79, listed, Aztèque seamount.

MATERIAL EXAMINED. — 10 specimens, 252-309 mm SL.

Norfolk Ridge. BERYX 11: stn 56, 23°23.05'S, 168°00.35'E (Aztèque seamount), 470-510 m depth, otter trawl, R. V. *"Alis"*, 22 October 1992: holotype , 286 mm SL (MNHN 1994-46)*. — 5 paratypes (same location as holotype): 262 mm SL (AMS-I.32494-001)*; 252 mm SL (MNHN 1994-47)*; 309 mm SL (NMNZ-P.29162)*; 268 mm SL (NMNZ-P.30165)*; 270 mm SL (NMNZ-P.30166)*.

New Caledonia. MUSORSTOM 4: stn CC 202, 18°58.00'S, 163°10.5'E (Grand Passage, northwest of New Caledonia), 580 m depth, otter trawl, R. V. *"Vauban"*, 20 September 1985: 4 non-type specimens (included in description), 254-271 mm SL (MNHN 1995-000)*.

DIAGNOSIS. — A species of *Rexea* differing from all others in having three to four dorsal finlets, four anal finlets, and the following combination of characters: second dorsal fin soft rays 13; two lateral lines, bifurcation below interspace between 6th and 7th dorsal fin spines; body naked (except tubed lateral line scales); length of second dorsal fin base in length of first dorsal fin base 2.4-2.5; pectoral fin short, 2.2-2.5 in head length, not extending to anterior part of lower lateral line; two small spines in second dorsal fin; pelvic spine reduced to a subdermal knob, originating on a vertical below middle of pectoral fin base; dorsal fin pale with dark distal margin, distal third of anterior two membranes dark black.

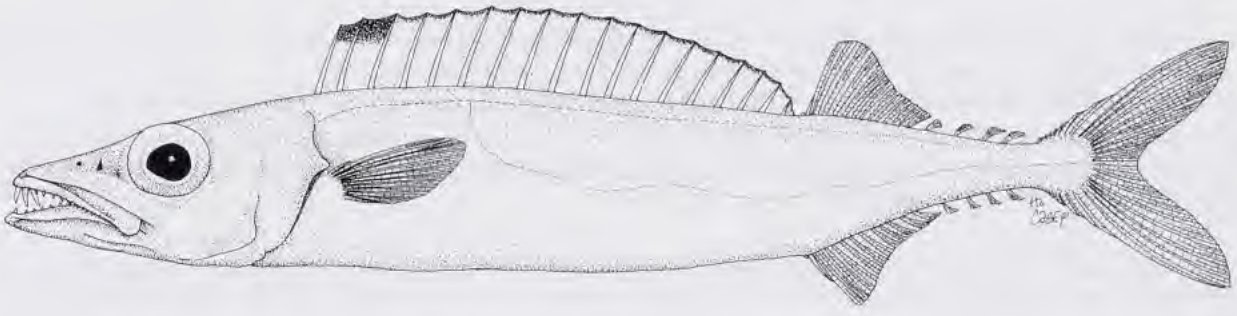

FIG. 3. — *Rexea alisae* sp. nov., holotype, MNHN 1994-46, 286 mm SL, Aztèque seamount, off New Caledonia. Drawn by Helen Casey.

DESCRIPTION. — Dorsal fin spines 18+2 (penultimate spine small and free, ultimate spine larger and comprised in second dorsal fin), dorsal fin rays 13, four (three or four, modally four) dorsal finlets; anal fin spines 1+1 (first small and free, second comprised in anal fin), anal fin rays 12, four anal finlets; pectoral fin rays 13 (13-14,

Source : MNHN, Paris

modally 13) (first ray simple, small); principal caudal fin rays 1+15+1, dorsal and ventral procurrent caudal fin rays 8/8 (1-6 very small); upper jaw with 3 (2-5) large fixed fangs and 0 (0-3) depressible fangs medially; 1 shorter fang anteriorly on each side of lower jaw and 18 (18-22) strong compressed teeth on premaxilla, vomer naked, palatine teeth present; tubed scales in upper lateral line 125 (holotype only), tubed scales anterior to branch 20 (20-25, modally 20, left side only); one gill raker on first arch at angle, remainder sinescent with 1-2 (1-3) spinules; pyloric caeca 8 (8-9, modally 8); vertebrae 19+15 = 34, epineurals present on vertebrae 1 to 29 (1 to 27-29); dorsal fin and anal fin pterygiophores bisegmental; 1st dorsal finlet pterygiophore bisegmental, 2nd-4th dorsal finlet pterygiophores trisegmental; 1st-4th anal finlet pterygiophores trisegmental; an elongate s-shaped bony stay posterior to last dorsal middle element and last anal middle element.

Selected morphometric data are given in Table 3. Body naked (except tubed lateral line scales), its greatest depth 6.1 (5.9-7.0) in SL, its width 11.2 (11.0-11.8) in SL. Lateral line branching below posterior half of interspace between 6th-7th dorsal fin spines; upper lateral line following profile of back, extending to below 3rd (2nd-4th) finlet; lower lateral line undulating mediolaterally, crossing caudal peduncle to caudal fin origin.

Head length 3.3 (3.1-3.3) in SL; fleshy orbit length 3.9 (3.4-4.1) in HL. Snout length 2.5 (2.5-2.7) in HL, its dorsal profile slightly concave; two nostrils present, anterior tubular and directed anteriorly, posterior an elongate slit; maxilla extending to a vertical midway between anterior margin of the fleshy orbit and the pupil; lower jaw prognathous. First dorsal fin originating on a vertical just behind upper angle of operculum, anterior 12 spines subequal in length; second dorsal fin short based, 2.4 (2.4-2.5) in base of first dorsal fin, its 2nd ray longest being just shorter than longest dorsal spine length; dorsal finlets not connected by membrane to base of last dorsal ray. Anal fin origin below origin of second dorsal fin, its base equal in length to base of second dorsal fin, 1st anal ray longest, anal finlets not connected by membrane to base of last anal ray. Caudal fin deeply forked. Pectoral fin short, 2.3 (2.2-2.5) in HL, extending to below the base of the 6th (6th-7th) dorsal spine, but not reaching the anterior part of the lower lateral line; pelvic fin reduced to sub-dermal nub.

Coloration (when fresh). Head and body metallic silver, darker dorsally; dorsal fin pale with dark margin and black blotch on anterior two interspinous membranes, remaining fins pale.

Coloration (in preservative). Head and body dark tan, darker dorsally; pupil silvery with elongate dusky blotch above and below iris; operculum with dark blotch equal in size to orbit length; dorsal fin pale with dark margin and black blotch on anterior two interspinous membranes, pectoral fin base with narrow dark blotch, caudal fin membranes dusky, remaining fins pale tan.

ETYMOLOGY. — Named for the ORSTOM research vessel *"Alis"*, based in Nouméa and responsible for the capture of the type specimens of this species together with many other new and rare marine taxa.

DISTRIBUTION. — Known from the type locality, Aztèque seamount, southeast of New Caledonia, and in Grand Passage, northwest of New Caledonia, taken by otter trawl at 470-580 m depth. Although most species of *Rexea* have relatively wide distributions in the Indian and Pacific Oceans, at least one other species in the genus has a restricted distribution. *Rexea brevilineata* Parin is confined to seamounts, occuring at depths of 180-400 m on the Nazca Submarine Ridge and adjacent parts of the Sala y Gomez Ridge in the southeastern Pacific Ocean (PARIN, 1989; NAKAMURA & PARIN, 1993: 47).

REMARKS. — *R. alisae* is distinguished from the other six species of *Rexea* by its greater number of finlets, absence of scales (except lateral line), and reduced pelvic fin. Based on these characters, *R. alisae* appears closest to *R. bengalensis*, but can be distinguished by a shorter pectoral fin length (2.2-2.5 vs 1.6-2.1 in HL) and ratios of first to second dorsal fin bases (2.4-2.5 vs 2.8-3.6). *Rexea alisae* shares high counts of dorsal and anal finlets (3-4 and 4 vs 3 and 3) and a naked body (except for lateral line scales) with *Rexichthys johnpaxtoni*, but *Rexea alisae* lacks the distinctive anterior projection of the lower lateral line, and the shape of the first dorsal fin is different (middle spine longest, vs second spine longest).

Source : MNHN, Paris

TABLE 3. — Selected measurements expressed as % standard length from type and non-type specimens of *Rexea alisae* sp. nov. captured off New Caledonia.(D = damaged).

	Paratype MNHN 1994-47	Paratype AMS I-32494-001	Paratype NMNZ P-30165	Paratype NMNZ P-30166	Holotype MNHN 1994-46	Paratype NMNZ P-29162	Min. - Max. n = 10
Standard length (mm)	252	262	268	270	286	309	252-309
Head length	30.7	30.8	31.6	31.6	30.6	30.9	30.6-32.5
Snout length	11.5	12.0	12.1	12.0	12.1	11.9	11.3-12.9
Upper jaw length	12.8	13.4	13.3	13.4			
13.2	13.1	12.8-14.0					
Orbit length	7.5	7.5	8.7	8.7	7.8	7.6	7.5-9.0
Postorbital head length	11.3	11.4	11.5	11.7	11.3	11.0	11.0-11.8
Interorbital width	7.3	6.8	8.3	8.4	7.1	6.5	6.5-9.3
Bony interorbital width	4.2	4.1	4.1	4.2	4.2	4.0	4.0-4.2
Body depth	14.6	15.1	16.9	17.0	16.4	16.1	14.2-17.0
Pectoral fin length	12.5	13.6	13.1	13.3	13.5	13.6	12.5-13.8
1st predorsal length	27.3	27.7	29.3	29.4	29.5	28.5	27.3-30.8
2nd predorsal length	75.0	75.1	75.4	76.3	75.3	76.1	74.0-76.4
Preanus length	69.8	71.2	70.7	69.2	70.0	71.8	69.2-71.8
Caudal peduncle length	6.7	7.3	6.7	7.3	7.1	7.2	6.6-7.7
Caudal peduncle depth	4.2	4.3	4.2	4.0	3.8	4.1	3.7-4.3
Longest dorsal spine (7-10th) length	7.8	9.2	8.8	8.9	8.7	8.8	7.8-9.2
Longest dorsal ray length	8.3	D	D	D	7.7	8.2	7.1-8.3
Longest anal ray length	7.3	7.4	7.5	7.1	7.3	D	7.1-7.5
Length of 1st dorsal fin base	48.1	47.8	47.2	48.5	47.8	48.8	47.2-48.8
Length of 2nd dorsal fin base	20.0	18.9	19.3	19.8	20.3	19.7	18.8-20.3
Length of anal fin base	19.0	18.7	19.2	19.7	20.0	20.0	18.2-20.0

Rexea bengalensis (Alcock, 1894)

Small gemfish, Escolier bengalais, Petit Escolier
Fig. 4, Table 4

Thyrsites bengalensis Alcock, 1894: 117-118, pl. VI fig. 6, original description, type locality Bay of Bengal off Madras, northern Indian Ocean, 265-457 m depth, largest specimen 133 mm.

Rexea prometheoides: DE BEAUFORT & CHAPMAN, 1951: 201, fig. 33, description, Makassar Strait, Sangi Islands, Ambon; length 173 mm.

Rexea bengalensis: PARIN, 1989: 103, description, key, lectotype designation, Arabian Sea to southern Japan and northern Australia. — PARIN & PAXTON, 1990: 115, fig.c, description, off Queensland Australia. — NAKAMURA & PARIN, 1993: 45, fig. 80, description, Indo-West Pacific.

MATERIAL EXAMINED. — 28 specimens, 125-196 mm SL.

Source : MNHN, Paris

New Caledonia (Grand Passage, northwest of New Caledonia). MUSORSTOM 4: stn CP 157, 18° 52.50'S, 163°16.90'E, 575 m depth, beam trawl, R. V. *"Vauban"*, 15 September 1985: 152 mm SL (MNHN 1995-1067)*. — Stn CP 180, 18°56.80'S, 163°17.70'E, 450 m depth, beam trawl, 18 September 1985: 2 specimens, 154-163 mm SL (MNHN 1995-1068)* and 2 specimens, 140-157 mm SL (NMNZ-P.31382)*. — Stn CC 202, 18°58.00'S, 163°10.50'E, 580 m depth, otter trawl, 20 September 1985: 3 specimens, 138-156.5 mm SL (MNHN 1995-1069)*.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 365, 19°42.82'S, 158°48.00'E, 710 m depth, beam trawl, R. V. *"Coriolis"*, 19 October 1986: 3 specimens, 156-182 mm SL (MNHN 1995-1070)*; 4 specimens, 168-196 mm SL (MNHN 1995-000)* and 2 specimens, 180-183 mm SL (NMNZ P.31383)*, — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m depth, otter trawl, 19 October 1986: 5 specimens, 149-170 mm SL (MNHN 1995-1071)*. — Stn CC 383, 19°40.85'S, 158°46.10'E, 600-615 m depth, otter trawl, 21 October 1986: 192 mm SL (MNHN 1995-1072)*.

Comparative specimens. — 5 specimens, 125-175 mm SL.

1 specimen, 175 mm SL (AMS-I.20919-009)*, Queensland, Australia. — 2 specimens, 125-147 mm SL (AMS I.21793-014)*, Queensland, Australia. — 2 specimens 128-153 mm SL (AMS-I.28137-002), Madagascar, western Indian Ocean.

DIAGNOSIS. — A species of *Rexea* with the following combination of characters two dorsal finlets and two anal finlets; two lateral lines, their point of bifurcation below 5th to 6th dorsal fin spines; body naked, except tubed lateral line scales; pectoral fin long, 1.6-2.1 in head length, extending past anterior part of lower lateral line; small pelvic spine present, 0.4-3.4%SL; dorsal fin pale with distinct black margin, distal three-quarters to one-half of anterior two interspinous membranes black; other fins pale; maximum size attained 200 mm SL, sexually mature at ca. 100 mm SL.

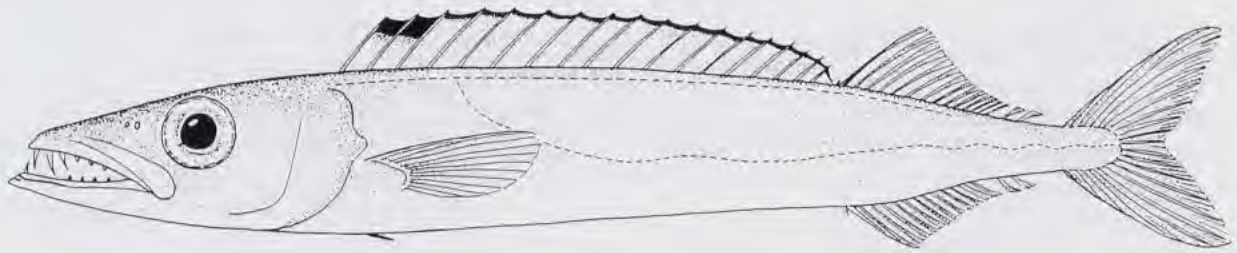

FIG. 4. — *Rexea bengalensis* (Alcock, 1894). Modified from NAKAMURA & PARIN (1993, fig. 80).

DESCRIPTION. — Dorsal fin spines 17-18+2 (modally 18) (penultimate spine small), dorsal fin rays 13-16 (modally 14), two dorsal finlets; anal fin spines 1+1 (first spine small and separate, second larger, comprised with fin), anal fin rays 11-13 (modally 12), two anal finlets; pectoral fin rays 14-15 (modally 14, first ray simple and small); principal caudal fin rays 1+15+1, dorsal and ventral procurrent caudal fin rays 7-8 and 7-8 (1-6 very small); upper jaw with 2-4 fixed and 0-3 depressible large fangs; lower jaw with 5-11 smaller compressed fangs, and 1-2 large slender fangs at tip; palatine teeth present; tubed scales in lateral line 84-100 (in four largest specimens examined); one gill raker on first arch at angle, remainder sinescent; pyloric caeca 6-8 (modally 7, n = 20); vertebrae 20+14 = 34; epineurals present on vertebrae 1 to 29-30; dorsal fin and anal fin pterygiophores bisegmental; the two dorsal finlet pterygiophores and the two anal finlet pterygiophores trisegmental; an elongate S-shaped bony stay posterior to last dorsal middle element and last anal middle element.

Selected morphometric characters, expressed as minimum-maximum %SL, are given in Table 4. Greatest body depth 5.3-7.8 in SL. Lateral line branching below interspace between 5th and 6th dorsal fin spines; upper lateral line following profile of back, extending to below last ray of second dorsal fin; lower lateral line undulating mediolaterally, crossing caudal peduncle to caudal fin origin. Head length 3.2-3.5 in SL; fleshy orbit length 3.6-4.4 in HL. Snout length 2.4-2.7 in HL, its dorsal profile slightly concave; maxilla extending to below anterior margin

Source : MNHN, Paris

of pupil; lower jaw prognathous. First dorsal fin originating on a vertical just before upper angle of operculum; second dorsal fin short based, 2.8-3.6 in base of first dorsal fin, its 2nd ray longest being just shorter than longest dorsal spine length. Anal fin origin below origin of second dorsal fin, its base equal to or less than length of base of second dorsal fin, 1st anal ray longest, anal finlets not connected by membrane to base of last anal ray. Caudal fin deeply forked. Pectoral fin long, 1.6-2.1 in HL, extending to below base of 7th-9th dorsal spine and reaching past anterior part of lower lateral line. Pelvic fin spine small, becoming relatively smaller with growth, viz: 3.4 to 0.4%SL.

TABLE 4. —Selected morphometric characters expressed as minimum-maximum % standard length from specimens of *Rexea bengalensis* (Alcock, 1894) captured in the Indo-West Pacific region, including New Caledonia and Australia. (ND = data not collected).

	New Caledonia This study n = 23	Australia This study n = 3	Madagascar This study n = 2	Indo-West Pacific Parin (1989) n = 8
Standard Length (mm)	138-196	125-175	128-153	99-178
Head length	28.3-31.3	29.0-31.6	29.8-30.2	29.6-34.7
Snout length	10.6-12.1	10.9-12.1	11.6-12.1	10.3-13.1
Upper jaw length	12.5-13.8	13.6-14.0	13.2-13.7	13.4-14.5
Orbit length	6.7-8.4	7.0-7.9	6.9-7.5	6.4-8.2
Bony interorbital width	3.7-4.8	4.1-4.6	4.9-5.1	4.0-5.0
Body depth	12.8-18.7	14.1-18.8	16.3-17.0	14.0-16.9
Body width	5.5-8.1	ND	ND	5.3-7.2
Pectoral fin length14.6-18.2	14.6-18.2	15.0-17.1	15.6-18.1	
Pelvic spine length0.4-3.4	ND	2.2-ND	0.6-1.6	
Caudal peduncle length	5.2-7.8	6.1-8.1	6.6-7.3	5.7-7.2
Caudal peduncle depth	3.0-4.5	3.5-3.7	3.3-3.8	3.1-3.6
Length of 1st dorsal fin base	51.0-57.5	50.1-54.3	53.2-53.3	50.0-54.3
Length of 2nd dorsal fin base	15.3-18.3	16.6-17.0	18.2-18.8	15.6-18.0
Ratio of length of bases D1/D2	2.8-3.6	2.9-3.2	2.8-2.9	2.7-3.4
Length of anal fin base	13.8-17.0	14.9-15.8	16.1-16.7	14.6-17.8

Coloration (when fresh): not observed by present authors and not described in the literature, however, colour pattern probably similar to coloration when preserved, except body more metallic silver.

Coloration (in preservative). Head and body silvery, becoming brownish dorsally; pupil silvery-yellow; dorsal fin membrane lightly pigmented medially with a dark blackish margin and a dark black blotch distally on anterior two interspinous membranes; remaining fins pale.

DISTRIBUTION. — Indo-West Pacific: Madagascar to southern Japan and northwest of New Caledonia, benthopelagic at depths of 140-820 m (at 450-710 m in the New Caledonian region). This is the first record for New Caledonia, and the most easterly for the species to date.

REMARKS. — *Rexea bengalensis* is the smallest gemfish known and although widely distributed in the Indo-West Pacific region, remains poorly understood both taxonomically and biologically. Very few studies have treated the species since the original description by ALCOCK (1894) (see synonymy above) and most diagnoses have been almost entirely based on characters with ranges overlapping those of closely related species, making identification difficult.

Source : MNHN, Paris

The most detailed descriptions of *Rexea bengalensis* were provided by PARIN (1989), based on 39 specimens 93-192 mm SL, and by NAKAMURA & PARIN (1993) based on PARIN's account. Generally our description of *R. bengalensis* from New Caledonia agrees with those of PARIN (1989) and NAKAMURA & PARIN (1993). There is slight variation in some morphometric character ranges (Table 4), but these are simply range increases attributable attribuable to our measurement of 28 specimens compared with 8 specimens reported by PARIN (1989 Table 1). PARIN (1989: 103) noted geographic variation in ratio of lengths of dorsal fin bases between specimens from Australian and Japanese waters (3.0-3.4) and specimens from the Indian Ocean (2.7-3.0). While our two specimens from the Indian Ocean (also examined by PARIN) have low ratios (2.8-2.9), the wide range of ratios from New Caledonian (2.8-3.6) and Australian (2.9-3.2) specimens investigated during the present study (Table 4) indicate that there is no geographic separation in this character.

Rexea bengalensis can be distinguished from other species of *Rexea* by its small maximum size and, except for *R. antefurcata*, by a combination of position of lateral line bifurcation, long pectoral fin, and naked body (except lateral line scales). *Rexea bengalensis* is very similar to juvenile *R. antefurcata*, and may be particularly difficult to diagnose when skin and fins have been damaged. Intact specimens can be distinguished from juvenile *R. antefurcata* by the absence (vs presence) of small scales on the caudal peduncle (best observed after allowing the skin to dry), subtle differences in coloration of the dorsal fin membrane (pale grey with a distal black margin, vs uniform dark grey-brown with distal black margin), smaller pelvic fin spine in specimens of comparable size (spine less than 3.5%SL, vs greater than 5.0%SL at 130 mm SL) and, in specimens of 100-200 mm SL, the presence of developing or mature gonads (vs gonads immature, just thin strings).

R. bengalensis is a voracious predator consuming prey items almost half its size. Out of the 23 New Caledonian specimens examined during the present study, 12 were found to contain a whole squid, prawn or fish (one with a cepolid of 15 mm HL).

KEY TO *REXEA* SPECIES AND OTHER CLOSELY RELATED GEMFISHES OCCURRING IN NEW CALEDONIAN WATERS

(Note: gemfishes are herein defined as gempylids possessing a black blotch on anterior 2-3 membranes of spinous dorsal fin)

1 Lateral line single, mid-lateral for most of its length; body entirely and finely scaled (at >20 cm SL) ..... ***Promethichthys prometheus*** (tropical and warm temperate waters)

1' Lateral line double, branching anteriorly near pectoral fin tip; body naked (except lateral line), or naked anteriorly **2**

2 Lower lateral line descending sharply to ventral profile, dividing into short anterior and long posterior branches; 2nd-3rd dorsal fin spines longest, dorsal fin outline uniformly descending posteriorly ..... ***Rexichthys johnpaxtoni*** (Tasman Sea and New Caledonia)

2' Lower lateral line curving down to mid-lateral position without anterior branch; middle dorsal fin spines longest, dorsal fin outline arcuate **3**

3 Dorsal fin soft rays 13; dorsal finlets 3-4; anal finlets 4; lateral line branches below base of 6th-7th dorsal fin spine..... ***Rexea alisae*** sp. nov. (New Caledonia)

3' Dorsal fin soft rays 14-19; dorsal finlets 2; anal finlets 2; lateral line branches below base of 3rd-6th dorsal fin spine **4**

4 Base of second dorsal fin (including finlets) 2.1-2.5 in base of first dorsal fin; pectoral fin length 2.2-2.4 in HL, fin not extending past lower lateral line; broad patch of scales extending from caudal peduncle to below middle of 1st dorsal fin base ..... ***Rexea prometheoides*** (Indo-West Pacific)

Source : MNHN, Paris

4' Base of second dorsal fin (including finlets) 2.7-3.6 in base of first dorsal fin; pectoral fin length 1.6-2.1 in HL, fin extending past lower lateral line; scales if present (excluding lateral line) confined to caudal peduncle and a narrow series along lower lateral line **5**

5 Body naked (except lateral line); lateral line branching below 5th to 6th dorsal fin spine; medial part of spinous dorsal fin membrane pale grey; pelvic fin spine present, in specimens 100-200 mm SL spine decreasing in length from 3.3 to 0.4%SL; maximum size 200 mm SL, mature at 100 mm SL ..... ***Rexea bengalensis*** (Indo-West Pacific)

5' Body finely scaled on caudal peduncle and along lateral line region; lateral line branching below 4th to 5th dorsal fin spine; medial part of spinous dorsal fin membrane dark grey-black or brown; pelvic fin spine absent in specimens over 270 mm SL, in specimens 100-200 mm SL spine decreasing in length from 5.1 to 2.0%SL; maximum size over 700 mm SL, mature at over 250 mm SL ..... ***Rexea antefurcata*** (subtropical South Pacific Ocean).

ACKNOWLEDGEMENTS

We thank the following for their help during the course of this study: Bernard SÉRET (ORSTOM, Paris) for the loan of specimens and editorial comment, Trevor WILLIS (Museum of New Zealand) for preparing radiographs, Helen CASEY (Museum of New Zealand) for fish drawings, Mark McGROUTHER, Tom TRNSKI, Diane BROWN (Australian Museum, Sydney) for assistance during the visit of CDR to Sydney, and Chris PAULIN (Museum of New Zealand), John PAXTON (AMS) and Jacques RIVATON (ORSTOM Nouméa, who also kindly provided the French "Résumé") for constructive comments on the manuscript. The senior author visited New Caledonia and participated in ORSTOM research cruises BERYX 2 (1991) and BERYX 11 (1992) with funding assistance from the French Ministry of Foreign Affairs, Paris, which is gratefully acknowledged. During these two visits professional assistance, friendly help and many courtesies were received, particularly from René GRANDPERRIN, Michel KULBICKI, Jacques RIVATON, captain M. LE BOULCH, the officers and crew of R. V. *"Alis"* and staff of "Département d'Océanographie du Centre ORSTOM de Nouméa". Warm thanks are extended to all.

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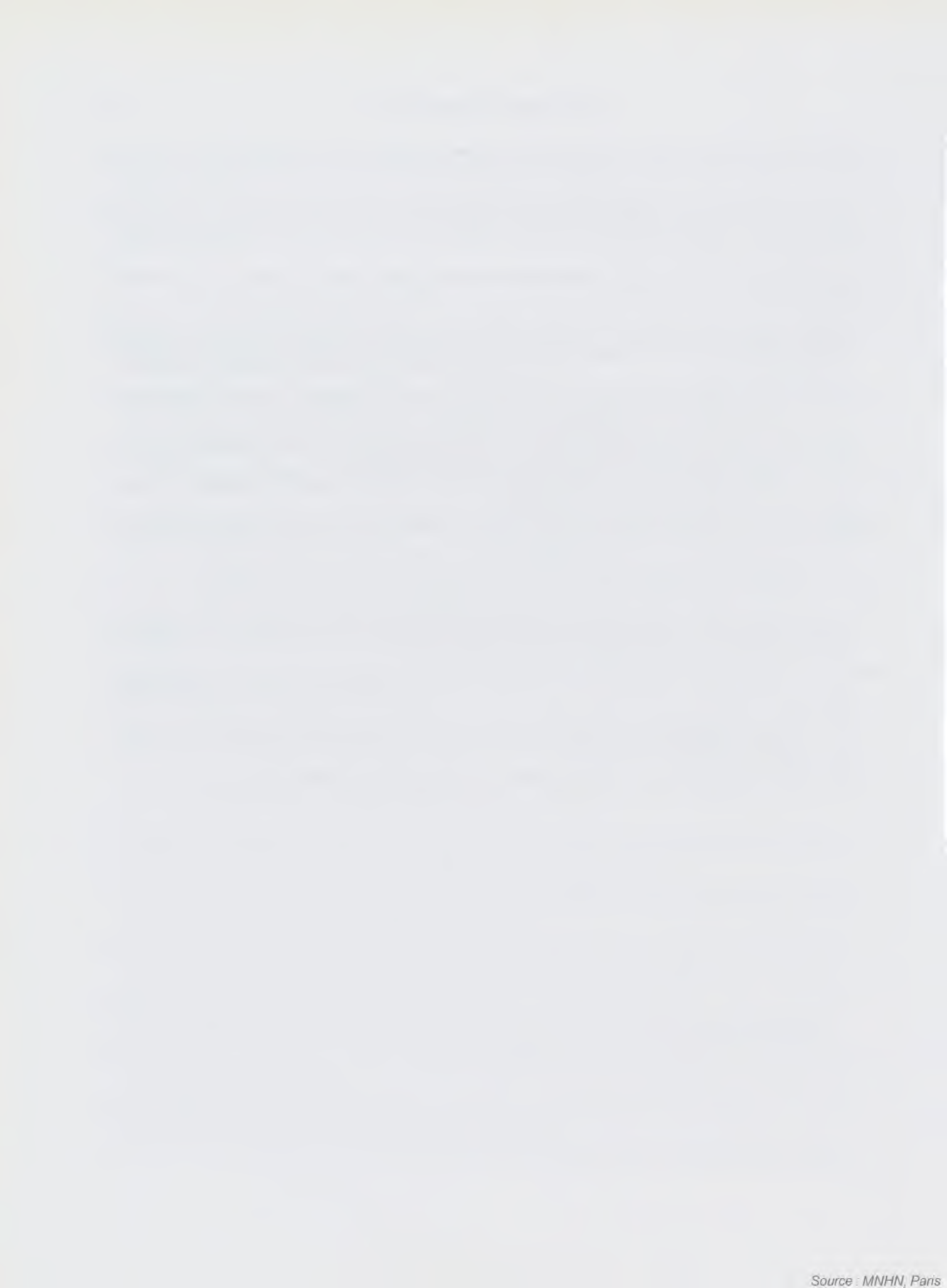

Source : MNHN, Paris

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Pisces, Pleuronectiformes: Flatfishes from the waters around New Caledonia. Six species of the bothid genera *Tosarhombus* and *Parabothus*

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ABSTRACT

Six species of the two related bothid genera *Tosarhombus* and *Parabothus* from the Coral Sea are described and keys to species are provided: *T. neocaledonicus* Amaoka & Rivaton, 1991, *T. longimanus* sp. nov., *T. brevis* sp. nov., *P. filipes* sp. nov., *P. kiensis* (Tanaka, 1918) and *P. coarctatus* (Gilbert, 1905). *T. longimanus* is characterized by having uniserial teeth on upper jaw, a pectoral fin on the ocular side longer than the head in males, 62 - 71 scales in the lateral line and a light brown

AMAOKA, K., MIHARA, E. & J. RIVATON, 1997. — Pisces, Pleuronectiformes: Flatfishes from the waters around New Caledonia. Six species of bothid genera *Tosarhombus* and *Parabothus*. *In*: SÉRET, B. (ed.), Résultats des Campagnes MUSORSTOM, Volume 17. *Mém. Mus. natn. Hist. nat.*, **174** : 143-172. Paris ISBN 2-85653-500-3.

Source : MNHN, Paris

body. *T. brevis* is characterized by having a deeper body, a shorter pectoral fin on the ocular side in males and smaller mouth. *P. filipes* is distinguished from known congeners of the genus by the greatly elongated pelvic fin in males and the small number of scales in the lateral line. *P. kiensis* and *P. coarctatus* represent first records from the Coral Sea.

RÉSUMÉ

Pisces, Pleuronectiformes : Poissons plats des eaux de la Nouvelle-Calédonie. Six espèces de Bothidae des genres *Tosarhombus* et *Parabothus*.

Six espèces de deux genres apparentés de la famille des Bothidae de la mer du Corail sont ici comparées et décrites : *Tosarhombus neocaledonicus* Amaoka & Rivaton, 1991 ; *T. longimanus* sp. nov. et *T. brevis* sp. nov. ; *Parabothus filipes* sp. nov., *P. kiensis* (Tanaka, 1918) et *P. coarctatus* (Gilbert, 1905). *Tosarhombus longimanus* se caractérise par des dents unisériées sur la mâchoire supérieure, la pectorale de côté oculé plus longue que la tête chez les mâles, 62-71 écailles sur la ligne latérale et une coloration marron clair. *T. brevis* se distingue par un corps plus haut, une pectorale plus courte sur le côté oculé chez les mâles et une bouche plus petite. *Parabothus filipes* se démarque de tous ses congénères par une nageoire pelvienne très allongée chez les mâles et un petit nombre d'écailles sur la ligne latérale. *P. kiensis* et *P. coarctatus* sont deux espèces nouvellement signalées de la Mer du Corail.

INTRODUCTION

Members of the bothid genera *Tosarhombus* and *Parabothus* are closely related to each other, widely distributed in Indo-Pacific region, and usually found at more than 200 m deep. The genus *Tosarhombus* characterized by an ovate body, a wide interorbital space, a strong rostral spine in males and white blotches along anterior head margin, includes four species (AMAOKA & RIVATON, 1991). *T. neocaledonicus* Amaoka & Rivaton, 1991 is the only species of this genus known from the Coral Sea.

The bothid genus *Parabothus* is distinguishable by the elliptical body, the narrow interorbital space, the absence of rostral spine (rarely a blunt knob) in males and the absence of white blotches along the head margin. It contains seven valid species. However, no species are known from the Coral Sea.

We have examined a large collection of flatfishes from waters around New Caledonia, captured during the recent ORSTOM cruises. In that collection, we have found three *Tosarhombus* species including two new species and three *Parabothus* species including one new species. Also *P. kiensis* and *P. coarctatus* are recorded for the first time from these waters. Descriptions of the six species belonging to these genera are given with synonymies and keys.

Specimens are deposited in Muséum national d'Histoire naturelle (MNHN), Paris, and Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University (HUMZ). Specimens were fixed in 10% formalin and preserved in 75% ethanol. Abbreviations for institutions follow LEVITON *et al.* (1985).

Methods of measurements and terminology follow AMAOKA, MIHARA & RIVATON (1993). Abbreviations of the meristic and proportional characters are as given in Table 1.

SYSTEMATIC ACCOUNT

Famille **BOTHIDAE**

Genus ***TOSARHOMBUS*** Amaoka, 1969

Tosarhombus Amaoka, 1969: 64 (type species: *Tosarhombus octoculatus* Amaoka, 1969, by original designation).

Source : MNHN, Paris

DIAGNOSIS. — Body ovate or elliptical. Tip of isthmus below posterior margin of lower eye. A strong rostral spine on snout in males, feebly developed or absent in females. Interorbital space concave, becoming wider with increasing body size, wider in males than in females. Dentition nearly similar on both sides of jaw. Scales ctenoid with short or elongate ctenii on ocular side. Lateral line developed only on ocular side. Pelvic fin on ocular side originating at tip of isthmus; base of ocular side fin longer than on blind side. Some white blotches along head margin. Body on blind side without markings. Three infraorbital bones on blind side. Four caudal plates (i.e., parhypural, two hypurals, and hypural + epural) without subdivisions.

REMARKS. — This genus closely resembles *Parabothus, Engyprosopon, Crossorhombus*, and *Bothus*, but it differs from *Parabothus* in having some white blotches along anterior margin of head, and wider interorbital width and deeper body depth when compared with same body size and same sex. It also differs from other three genera in having the isthmus tip extending to below the posterior margin of lower eye (middle or anterior half of lower eye) (see AMAOKA & RIVATON, 1990).

TABLE 1. — Abbreviations of the counts and proportional measurements.

D	Number of dorsal fin rays	TL	Total length
A	Number of anal fin rays	SL	Standard length
P1	Number of pectoral fin rays	HL	Head length
P2	Number of pelvic fin rays	BD	Body depth
C	Number of caudal fin rays	SNL	Snout length
	(as upper unbranched rays + branched	UED	Upper eye diameter
	rays + lower unbranched rays)	LED	Lower eye diameter
LLS	Number of scales in lateral line	IW	Interorbital width
GR	Number of gill rakers on first arch	UJL	Upper jaw length
	(as upper limb + lower limb)	LJL	Lower jaw length
V	Number of vertebrae	DCP	Depth of caudal peduncle
	(as abdominal vertebrae	P1L	Pectoral fin length
	+ caudal vertebrae)	P2L	Pelvic fin length
SD	Standard deviation	P2B	Pelvic fin base length
O	Ocular side	LDFR	Length of longest dorsal fin ray
B	Blind side	LAFR	Length of longest anal fin ray
M	Male(s)	MCFR	Length of mid-caudal fin ray
F	Female(s)	LLCW	Lateral line curve width
Y	Young(s)		

KEY TO NEW CALEDONIAN SPECIES OF *TOSARHOMBUS*

1 Scales more than 80 in lateral line; usually five or six white blotches along head margin in mature specimens ..... ***T. neocaledonicus***

1' Less than 71 scales in lateral line; less than five white blotches along head margin **2**

2 Mouth large, upper jaw length on ocular side, 2.44-2.75 in head length; pectoral fin on ocular side greatly elongated, longer than head in males (much shorter than head in females); body shallow (when compared with specimen of about same size), its depth 2.14-2.47 in SL (Fig. 7); interorbital width wide in either sexes (Fig. 5) ..... ***T. longimanus* sp. nov.**

Source : MNHN, Paris

2' Mouth small, upper jaw length on ocular side 2.78-3.06 head length; pectoral fin on ocular side less than head in both sexes; body deep (when compared with specimen of about same size), its depth 1.92-2.35 in SL (Fig. 7); interorbital width narrow in both sexes (Fig. 5) ..... ***T. brevis* sp. nov.**

Tosarhombus neocaledonicus Amaoka & Rivaton, 1991

Tables 2-3

Tosarhombus neocaledonicus Amaoka & Rivaton, 1991: 461, fig. 12-13.

Bothus sp.: Richer de Forges & Pianet, 1984: annexe 2.
Tosarhombus sp. nov.: Rivaton, 1989: 155 (in part).

Material examined. — 30 specimens (7 males, 22 females and 1 young).

Chesterfield and Bellona Plateaus. Chalcal 1: stn CP 10, 20°00.20'S, 158°46.60'E, 225 m, beam trawl, R. V. *"Coriolis"*, 22 July 1984: holotype, male 166.5 mm (MNHN 1988-686); 1 paratype, female 109.0 mm (MNHN 1988-687, part); 2 paratypes, females 105.3-143.0 mm (HUMZ 114940, 114942); 3 females 84.2-122.3 mm (MNHN 1991-452, part). — Stn CP 17, 22°34.70'S, 159°15.30'E (Nova Bank), 295 m, beam trawl, 28 July 1984: 1 paratype, female 173.2 mm (MNHN 1988-687, part).

Corail 2: stn 131, 19°25.49'S, 158°37.96'E, 217 m, beam trawl, R. V. *"Vauban"*, 29 July 1988: 1 paratype, male 183.1 mm (HUMZ 114938); 1 female 133.1 mm (MNHN 1991-451, part). — Stn 142, 19°36.16'S, 158°26.79'E, 193 m, beam trawl, 30 July 1988: 1 paratype, female 140.8 mm (HUMZ 114939); 1 female 145.8 mm (MNHN 1991-451, part); 1 young 74.6 mm (HUMZ 129466). — Stn 162, 19°46.24'S, 158°25.67'E, 203 m, beam trawl, 1st August 1988: 2 paratypes, females 115.5-140.8 mm (HUMZ 114941, 119270); 1 male 132.1 mm (MNHN 1991-452).

Musorstom 5: stn CP 253, 25°08.70'S, 159°55.26'E (Capel Bank), 295 m, beam trawl, R. V. *"Coriolis"*, 7 October 1986: 1 male 154.4 mm (MNHN 1994-320). — Stn CP 254, 25°10.07'S, 159°53.07'E (Capel Bank), 280-290 m, beam trawl, 7 October 1986: 1 female 133.0 mm (MNHN 1994-319). — Stn CP 259, 25°31.64'S, 159°44.47'E (Capel Bank), 285 m, beam trawl, 8 October 1986: 1 male 140.4 mm (MNHN 1994-323). — Stn CP 267, 25°23.60'S, 159°47.20'E (Capel Bank), 285 m, beam trawl, 8 October 1986: 1 male 137.7 mm (MNHN 1994-324). — Stn CP 268, 24°44.70'S, 159°39.20'E (Capel Bank), 280-290 m, beam trawl, 9 October 1986: 1 male 172.2 mm (HUMZ 129469); 1 female 148.7 mm (MNHN 1994-326). — Stn CP 276, 24°48.90'S, 159°40.90'E (Capel Bank), 269-258 m, beam trawl, 9 October 1986: 2 females, 122.9-132.9 mm (MNHN 1994-321, 322); 1 male and 1 female 131.1-153.1mm (HUMZ 129467, 129468). — Stn CP 318, 22°26.51'S, 159°21.36'E, 330 m, beam trawl, 13 October 1986: 3 females 157.8-163.0 mm (NMHN 1994-327, 328, 329). — Stn CP 319, 22°24.40'S, 159°16.50'E, 320-325 m, beam trawl, 13 October 1986: 1 female 164.7 mm (MNHN 1994-325).

Diagnosis. — More than 80 scales in lateral line; pectoral fin on ocular side of males, longer than head, 0.5-0.8 in head length; teeth on upper jaw uniserial; body on ocular side light brown.

Description. — Counts and proportional measurements as percent of SL are shown in Tables 2 and 3. For description, coloration, and sexual dimorphism see Amaoka & Rivaton (1991).

Distribution. — Known only from the Chesterfield Plateau, the Nova Bank, and the Capel Bank, west of New Caledonia, at depths of 169-325 m.

Remarks. — This species resembles *Tosarhombus longimanus* sp. nov., but differs from it as shown in the remarks of the latter.

Source : MNHN, Paris

TABLE 2. — Frequency distribution of eight meristic characters of *Tosarhombus neocaledonicus* Amaoka & Rivaton, 1991. Parenthesis for pectoral fin are used to distinguish ocular (without) from blind (with) side.

Dorsal fin rays										Anal fin rays						
101	102	103	104	105	106	107	108	109	110	81	82	83	84	85	86	87
2	3	7	9	1	4	1	1	0	2	1	6	8	9	4	1	1

Pectoral fin rays				Caudal fin rays			Vertebrae	
11	12	13	14	2+12+2	3+11+3	2+13+2	10+31	10+32
0(15)	0(15)	13(0)	17(0)	2	2	26	3	24

Scales in lateral line																Gill rakers		
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95		0+7	0+8	0+9
		1	0	2	0	3	5	5	4	6	1	1	1	0	0	1	7	14	9			

TABLE 3. — Ranges of variation and averages (in parentheses) of proportional measurements expressed as % of SL and meristic counts for three New Caledonian species of *Tosarhombus*.

	T. longimanus		*T. brevis*		*T. neocaledonicus*
	Holotype	Paratypes	Holotype	Paratypes	Type series & others
Number	Male	4M + 12F	Male	2M+5F+3youngs	7M+22F+1young
SL (mm)	125.0	65.2-139.7	133.4	48.7-121.1	74.6-183.1
HL	26.9	25.2-27.5 (26.3)	25.3	25.6-27.9 (26.6)	24.5-28.5 (26.1)
BD	43.6	40.5-46.7 (43.0)	52.1	42.5-51.6 (48.8)	42.6-50.9 (45.1)
SNL	5.6	5.2-5.9 (5.4)	5.2	4.7-5.9 (5.3)	4.4-5.7 (5.1)
UED	7.3	6.0-8.4 (7.2)	7.1	7.1-9.9 (8.4)	5.9-8.4 (6.9)
LED	7.1	6.2-8.2 (7.1)	7.3	7.0-10.1 (8.4)	6.0-8.3 (6.9)
IW (M)	9.0	5.9-9.5 (8.3)	7.3	3.9-7.5 (6.2)	8.7-12.0 (10.8)
IW (F)		2.8-6.6 (5.1)		0.8-3.7 (2.1)	3.2-8.0 (6.4)
UJL (O)	10.3	9.4-10.6 (9.9)	8.5	8.6-9.7 (9.1)	8.3-9.7 (9.0)
UJL (B)	10.3	9.7-10.9 (10.1)	8.6	8.8-9.7 (9.1)	8.3-10.4 (9.3)
LJL (O)	12.6	11.5-13.4 (12.4)	10.7	10.7-12.7 (11.9)	10.3-12.6 (11.4)
LJL (B)	13.6	12.6-14.3 (13.5)	12.0	12.2-14.0 (13.0)	11.3-13.7 (12.5)
DCP	9.8	9.0-10.6 (9.5)	10.9	9.7-10.4 (10.2)	8.8-10.1 (9.4)
P1L (O, M)	52.8	32.1-51.5 (45.5)	24.1	20.1-22.2 (22.1)	39.3-52.6 (46.0)
P1L (O, F)		16.9-21.6 (19.9)		16.4-19.1 (18.1)	16.1-26.7 (19.9)
P1L (B)	9.7	8.7-10.6 (9.8)	10.6	8.9-10.6 (9.8)	9.9-12.7 (11.0)
P2L (O)	9.8	9.1-11.2 (10.3)	11.6	11.1-12.9 (11.7)	10.4-14.2 (12.5)
P2L (B)	9.5	8.4-10.4 (9.4)	10.0	9.8-10.6 (10.2)	8.3-11.3 (9.8)
P2B (O)	7.8	7.2-8.7 (8.0)	7.6	7.4-8.2 (7.8)	7.7-9.6 (8.6)
P2B (B)	4.3	3.5-4.7 (4.3)	4.3	4.0-4.6 (4.3)	4.0-4.9 (4.4)
LDFR	13.4	11.0-15.0 (13.0)	12.4	12.9-14.6 (13.5)	9.9-13.0 (11.8)
LAFR	13.5	12.2-15.6 (13.6)	12.8	13.0-15.4 (13.9)	10.6-13.0 (11.9)
MCFR	20.6	18.2-21.3 (19.9)	20.2	19.1-23.6 (21.3)	18.3-22.7 (20.0)
LLCW	16.8	13.5-17.4 (15.6)	16.4	13.7-16.8 (15.1)	13.7-17.9 (15.9)

Source : MNHN, Paris

TABLE 3 (Continued). — Meristic counts for three New Caledonian species of *Tosarhombus*.

	T. longimanus		*T. brevis*		*T. neocaledonicus*
	Holotype	Paratypes	Holotype	Paratypes	Type series & others
Number	Male	4M + 12F	Male	2M+5F+3youngs	7M+22F+1young
SL (mm)	125.0	65.2-139.7	133.4	48.7-121.1	74.6-183.1
D	98	95-102 (98.4)	102	97-104 (100.6)	101-110 (104.3)
A	77	75-81 (78.2)	81	77-83 (80.0)	81-87 (83.5)
P1 (O)	13	12-13 (12.8)	13	12-14 (12.6)	13-14 (13.6)
P1 (B)	10	9-10 (9.8)	11	9-11 (10.5)	11-12 (11.5)
LLS	63	62-71 (64.9)	71	64-71 (67.3)	81-95 (87.4)
GR	0+8	0+6-9 (0+7.6)	0+7	0-1+7-9 (0.1+7.6)	0+7-9 (0+8.1)
V	10+30	10+30-31 (10+30.2)	10+32	10+30-32 (10+31.0)	10+31-32 (10+31.9)

Tosarhombus longimanus sp. nov.

Figs 1-7; Tables 3-4

MATERIAL EXAMINED. — 17 specimens (5 males and 12 females).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 351, 19°33.10'S, 158°36.90'E, 290-310 m, beam trawl, R. V. *"Coriolis"*, 17 October 1986: holotype, male 125.0 mm (MNHN 1994-334). — Stn DW 350, 19°34.00'S, 158°35.30'E, 280 m, beam trawl, 17 October 1986: 1 paratype, male 98.2 mm (MNHN 1994-342). — Stn CP 351, 19°33.10'S, 158°36.90'E, 290-310 m, beam trawl, 17 October 1986: 7 paratypes, females 69.3-125.0 mm (MNHN 1994-335 to 341); 1 paratype, male 122.9 mm (HUMZ 129473).

CHALCAL 1: stn CP 5, 19°29.10'S, 158°37.63'E, 290 m, beam trawl, R. V. *"Coriolis"*, 6 July 1984: 3 paratypes, 1 male and 2 females 65.2-139.7 mm (MNHN 1994-330 to 332). — Stn CP 10, 20°00.20'S, 158°46.60'E, 225 m, beam trawl, 22 July 1984: 1 paratype, female 66.6 mm (HUMZ 129470).

CORAIL 2: stn 130, 19°27.41'S, 158°34.00'E, 217 m, beam trawl, R. V. *"Vauban"*, 29 July 1988: 3 paratypes, 1 female 135.9 mm (MNHN 1994-333); 1 male and 1 female 125.1-131.5 mm (HUMZ 129471, 129472).

DIAGNOSIS. — Upper jaw length on ocular side 2.44-2.75 in head length; teeth on upper jaw uniserial; pectoral fin on ocular side much longer than head in males; 62-71 scales in lateral line; body depth 2.14-2.47 in SL (Fig. 7).

DESCRIPTION. — Data for holotype are given first, followed in parentheses by ranges for paratypes and averages including holotype for proportional data. Counts and proportional measurements as percent of SL are shown in Tables 3 and 4. Head length 3.72 in SL (3.64-3.96, 3.80); body depth 2.29 (2.14-2.47, 2.33). Snout length 4.80 in head length (4.55-5.11, 4.83); upper eye diameter 3.69 (3.24-4.38, 3.67); lower eye diameter 3.78 (3.30-4.23, 3.72); interorbital width 2.97 (2.71-4.41, 3.22) in males, (3.81-9.94, 5.78) in females; upper jaw length 2.60 (2.44-2.75, 2.65) on ocular side, 2.60 (2.45-2.74, 2.61) on blind side; lower jaw length 2.14 (2.02-2.24, 2.12) on ocular side, 1.98 (1.87-2.04, 1.95) on blind side; depth of caudal peduncle 2.73 (2.51-2.98, 2.79); pectoral fin length 0.51 (0.50-0.81, 0.61) on ocular side in males, (1.24-1.54, 1.34) in females, 2.78 (2.47-3.05, 2.69) on blind side; pelvic fin length 2.75 (2.37-2.93, 2.56) on ocular side, 2.82 (2.61-3.07, 2.80) on blind side; pelvic fin base length 3.43 (2.99-3.60, 3.30) on ocular side, 6.22 (5.45-7.44, 6.21) on blind side; length of longest dorsal fin ray 2.01 (1.78-2.29, 2.03), length of longest anal fin ray 1.99 (1.71-2.17, 1.95); length of middle caudal fin ray 1.30 (1.23-1.47, 1.32); curved length of lateral line 1.60 (1.53-1.98, 1.69).

Body ovate, deepest point slightly in front of middle part of body, its depth about 1.5-1.9 times of head length; dorsal and ventral contours gently arched. Caudal peduncle deep, its depth about 21-25 % of body depth. Head

Source : MNHN, Paris

large; upper profile with a large notch in front of upper margin of lower eye, steep in males, less so in females and youngs (Figs 2-3). Slightly protruding snout, 66-89 % of upper eye diameter. A strong rostral spine in males, poorly developed or absent in females and youngs (Fig. 3). Eyes small, upper eye diameter 62-82 % of upper jaw length on ocular side; lower eye in advance of upper. An orbital spine anterior to upper eye in males, absent in females and youngs. Interorbital region concave, becoming wider with increasing body size, wider in males than in females and youngs (Figs 2, 3, 5). Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril tubular with posterior flap; nostrils on blind side small, below origin of dorsal fin, similar in shape to those on ocular side. Mouth large, oblique; maxilla extending almost vertical to middle part of lower eye; anterior tips of both jaws nearly on same vertical line when mouth closed. A small ventral knob at mandibular symphysis. Teeth on upper jaw sharp, uniserial, becoming larger and more widely spaced anteriorly, some anterior canine-like teeth. Lower jaw teeth uniserial, nearly similar to anterior teeth of upper jaw in terms of size and spacing. Gill rakers on first arch slender, not serrate, absent on upper limb. Scales on ocular side large, with long ctenii (Fig. 4A), snout, both jaws and pectoral fin naked; cycloid scales on blind side. Lateral line curved above pectoral fin on ocular side, absent on blind side. Dorsal fin origin on blind side, anterior to upper margin of lower eye. Anal fin origin slightly anterior to vertical of posterior margin of head. Pectoral fin on ocular side longer than head in males, much shorter than head in females (Figs 2, 3, 6), but longer than fin on blind side. Pelvic fins with 6 rays; base on ocular side longer than that on blind side, approximately fourth ray on ocular side opposite to first ray on blind side. Tip of isthmus below posterior margin of lower eye. All fin rays simple except for caudal fin rays. Caudal fin rays branched except for two upper- and lowermost rays. Vent on blind side, immediately above first anal fin ray. Urogenital papilla on opposite side of vent.

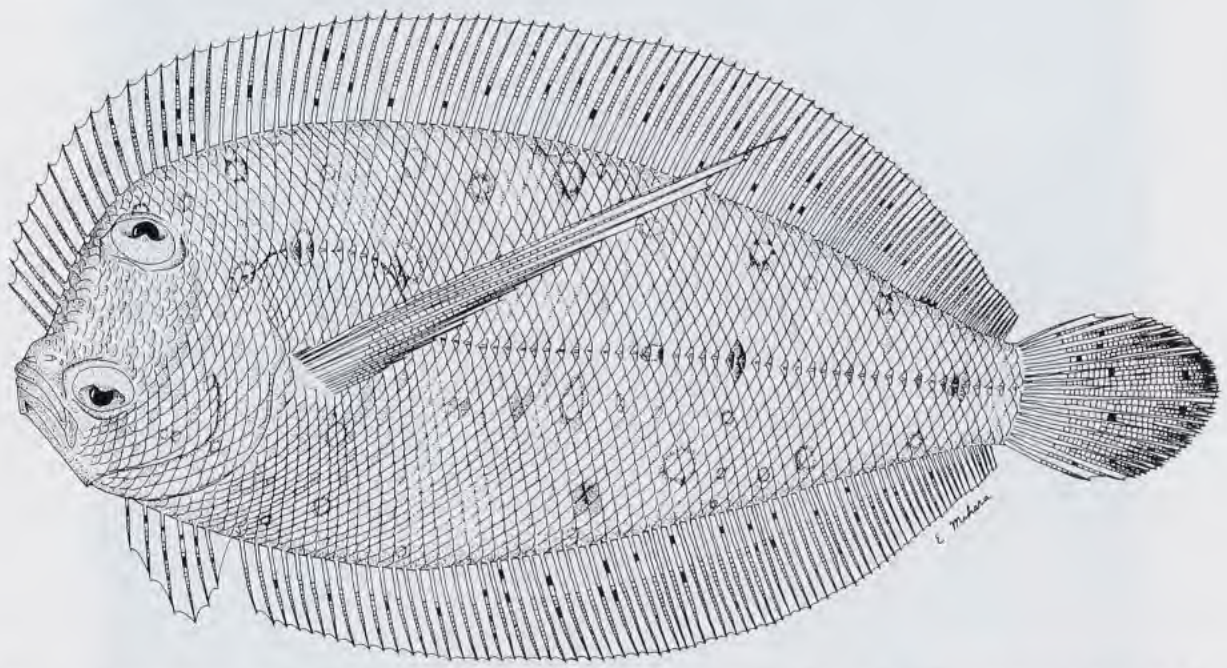

FIG. 1. — *Tosarhombus longimanus* sp. nov., holotype, male, 125.0 mm, from Chesterfield Plateau, west of New Caledonia (MNHN 1994-334).

Coloration (in alcohol). Body color on ocular side light brown; anterior margin of head darkened; a series of three to five white blotches along head margin in front of interorbital space and upper eye; an diffused dark blotch at junction of straight and curved parts of lateral line, a few obscure dark blotches on straight portion of lateral line; many indistinct whitish markings on entire body, some with dark rings. Blind side pale yellowish white. Dorsal and anal fins with a series of dark spots; pelvic fin with scattered small dark spots.

Source : MNHN, Paris

Sexual dimorphism. This species shows sexual dimorphism in the presence or absence of rostral and orbital spines (Fig. 3), the interorbital width (Figs 2, 3, 4), the length of pectoral fin on ocular side (Figs 2, 3, 6), and the curvature of anterior dorsal profile (Figs 2-3).

DISTRIBUTION. — The specimens were collected from the Chesterfield Plateau, at depths of 217-310 m.

ETYMOLOGY. — Named for the prolonged pectoral fin on the ocular side in males.

REMARKS. — *T. longimanus* sp. nov. most closely resembles two New Caledonian species, *T. neocaledonicus* and *T. brevis* sp. nov. in having uniserial upper jaw teeth and light brown body on the ocular side, but differs from the former species in having the lower number of scales in the lateral line, and rather low numbers of dorsal fin ray, pectoral fin rays, anal fin rays and vertebrae, and longer upper jaw (Table 3), and from the latter species as shown in the remarks of *T. brevis*.

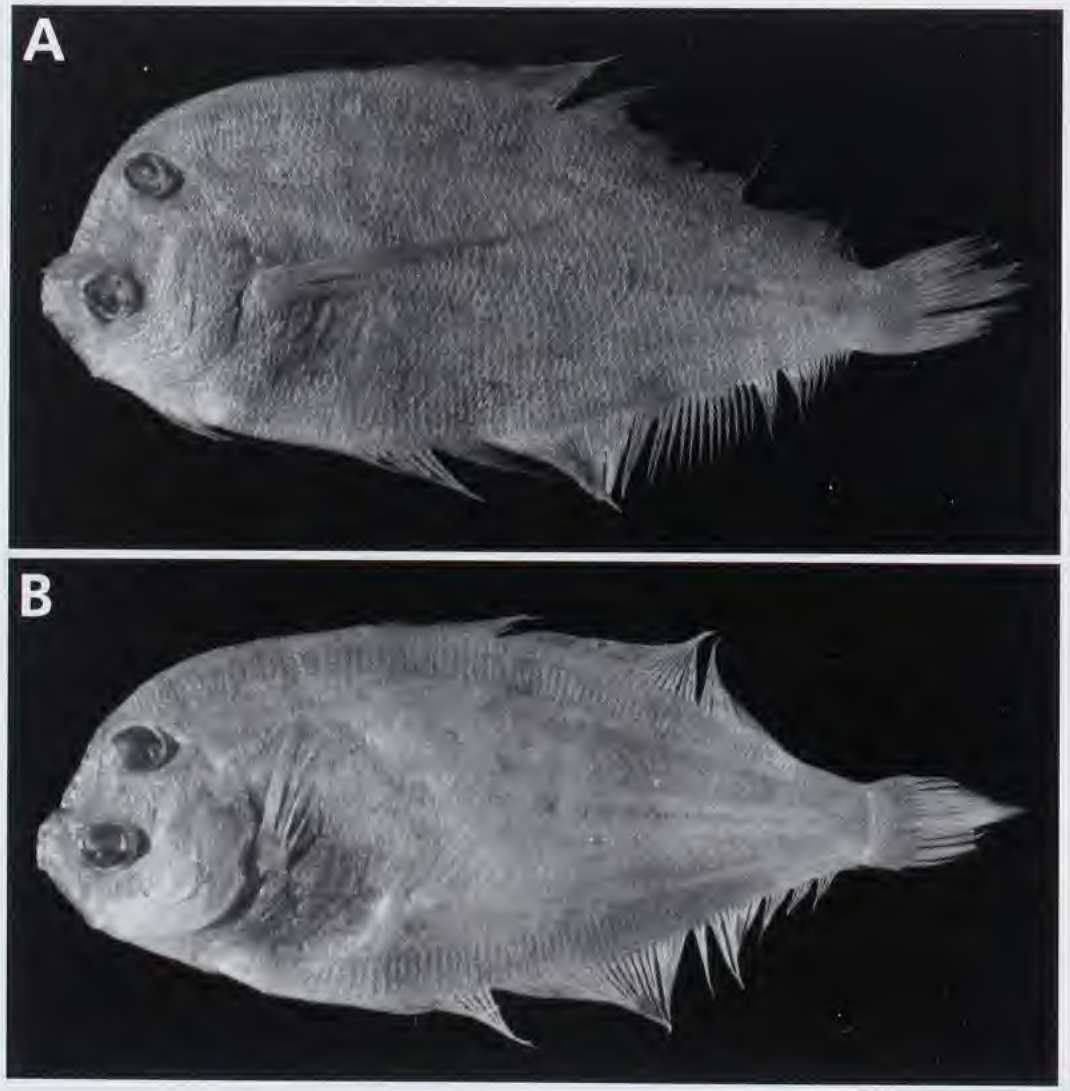

FIG. 2. — *Tosarhombus longimanus* sp. nov. — **A**: holotype, male, 125.0 mm, from Chesterfield Plateau, west of New Caledonia (MNHN 1994-334). — **B**: paratype, female, 131.5 mm, from Chesterfield Plateau, west of New Caledonia (HUMZ 129472).

Source : MNHN, Paris

TABLE 4. — Frequency distribution of eight meristic characters of *Tosarhombus longimanus* sp. nov. Counts for holotype included in boldfaced numbers.

Dorsal fin rays								Anal fin rays						
95	96	97	98	99	100	101	102	75	76	77	78	79	80	81
1	4	0	**4**	2	3	2	1	1	1	**4**	5	2	2	2

Pectoral fin rays					Caudal fin rays	
9	10	11	12	13	2+12+2	2+13+2
0(4)	0(**12**)	0(0)	3(0)	**14**(0)	1	**16**

Scales in lateral line										Gill rakers				Vertebrae	
62	63	64	65	66	67	68	69	70	71	0+6	0+7	0+8	0+9	10+30	10+31
1	**3**	6	3	1	0	1	1	0	1	1	7	**6**	3	**13**	4

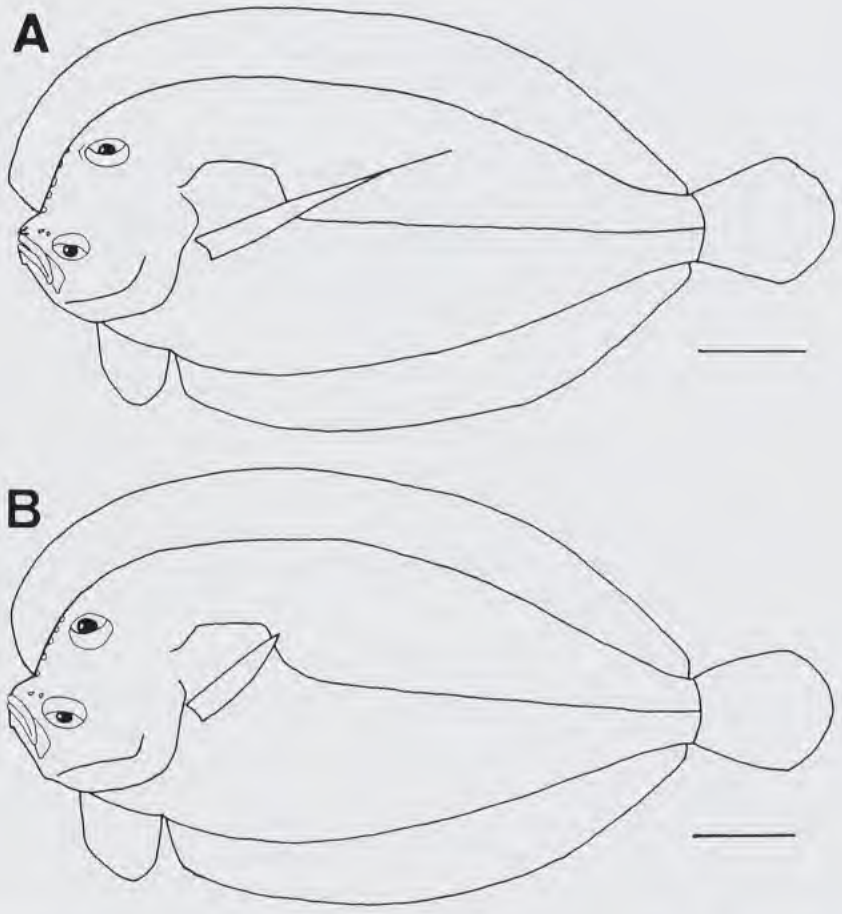

FIG. 3. — Diagrammatic illustration of body parts showing sexual dimorphism in male (A) and female (B) in *Tosarhombus longimanus* sp. nov. Scale bars 20 mm.

Source : MNHN, Paris

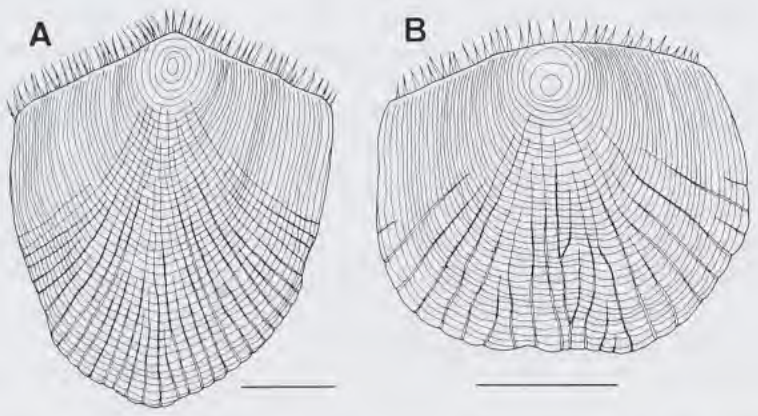

FIG. 4. — Scales from ocular side. — **A**: *Tosarhombus longimanus* sp. nov., paratype, 139.7 mm (MNHN 1994-331). — **B**: *T. brevis* sp. nov., paratype, 115.0 mm (HUMZ 129475). Scale bars 1 mm.

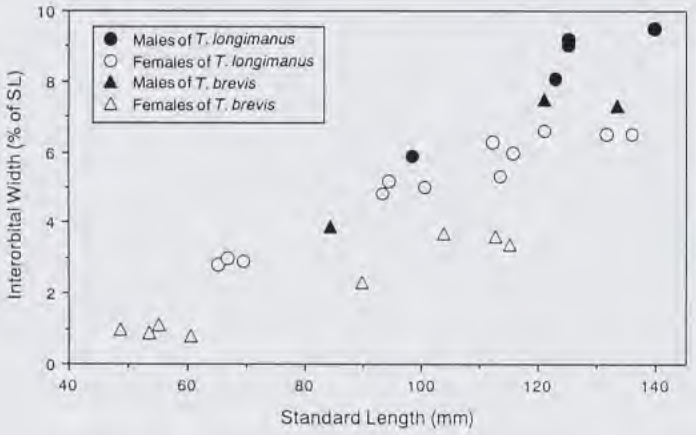

FIG. 5. — Relationships between SL and interorbital width in percent of SL in two species of *Tosarhombus*.

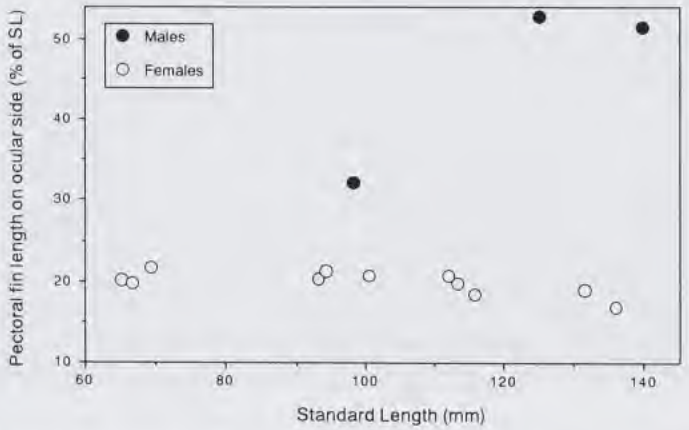

FIG. 6. — Relationships between SL and pectoral fin length on ocular side in percent of SL in *Tosarhombus longimanus* sp. nov.

Source : MNHN, Paris

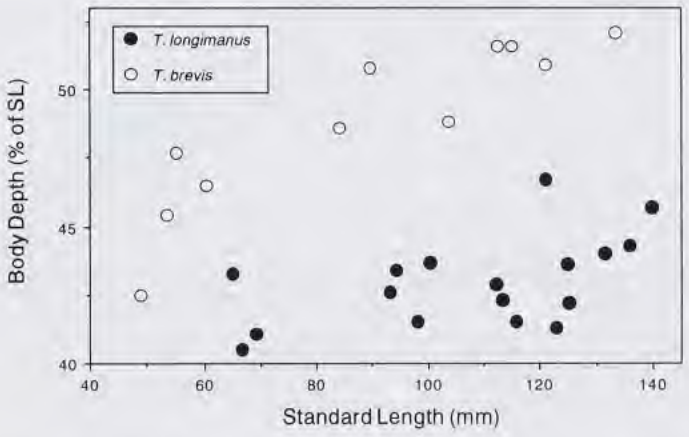

FIG. 7. — Relationships between SL and body depth in percent of SL in two species of *Tosarhombus*.

Tosarhombus brevis sp. nov.

Figs 4-5, 7-10; Tables 3, 5

MATERIAL EXAMINED. — 11 specimens (3 males, 5 females and 3 youngs).

New Caledonia. MUSORSTOM 4: stn CC 173, 19°02.50'S, 163°18.80'E, 250-290 m, shrimp trawl, R. V. *"Coriolis"*, 29 September 1985: holotype, male 133.4 mm (MNHN 1994-347). — Stn CP 154, 19°02.60'S, 163°17.80'E, 275 m, beam trawl, 14 September 1985: 1 paratype, male 121.1 mm (MNHN 1994-77). — Stn CC 173, 19°02.50'S, 168°18.80'E, 250-290 m, shrimp trawl, 29 September 1985: 1 paratype, female 112.5 mm (MNHN 1994-348).

BIOCAL: stn CP 110, 22°12.38'S, 167°06.43'E, 275-320 m, beam trawl, R. V. *"Jean Charcot"*, 9 September 1985: 1 paratype, male 84.2 mm (MNHN 1994-349).

Loyalty Islands MUSORSTOM 6: stn CP 445, 20°54.29'S, 167°17.16'E (Lifou Island), 261 m, beam trawl, R. V. *"Alis"*, 19 February 1989: 2 paratypes, 1 female 103.7 mm (HUMZ 129474) and 1 female 89.7 mm (MNHN 1994-343). — Stn CP 455, 21°00.65'S, 167°26.08'E, 260 m, beam trawl, 20 February 1989: 5 paratypes, 1 female and 2 youngs, 48.7-60.4 mm (MNHN 1994-344 to 346); 1 female and 1 young, 53.5-115.0 mm (HUMZ 129475, 129476).

DIAGNOSIS. — Short upper jaw on ocular side, 2.78-3.06 in head length; teeth on upper jaw uniserial; body deep, its depth 1.92-2.35 in SL (Fig. 7); interorbital width narrow (Fig. 5); scales in the lateral line 64-71; pectoral fin on ocular side scarcely prolonged in either sexes, shorter than head length.

DESCRIPTION. — Data for holotype are given first, followed in parentheses by ranges for paratypes and averages including holotype for proportional data. Counts and proportional measurements as percent of SL are shown in Tables 3 and 5. Head length 3.96 in SL (3.58-3.91, 3.77); body depth 1.92 (1.94-2.35, 2.06). Snout length 4.81 in head length (4.70-5.64, 5.03); upper eye diameter 3.55 (2.77-3.60, 3.20); lower eye diameter 3.44 (2.71-3.65, 3.18); interorbital width 3.47 (3.41-7.12, 4.67) in males, (7.16-31.80, 18.15) in females; upper jaw length 2.98 (2.78-3.06, 2.92) on ocular side, 2.93 (2.69-3.00, 2.91) on blind side; lower jaw length 2.36 (2.07-2.38, 2.23) on ocular side, 2.11 (1.99-2.16, 2.05) on blind side; depth of caudal peduncle 2.32 (2.50-2.83, 2.62); pectoral fin length 1.05 (1.15-1.39, 1.20) on ocular side in males, (1.37-1.61, 1.48) in females, 2.39 (2.44-3.00, 2.72) on blind side; pelvic fin length 2.17 (2.11-2.42, 2.27) on ocular side, 2.51 (2.48-2.71, 2.61) on blind side; pelvic fin base length 3.30 (3.27-3.59, 3.41) on ocular side, 5.81 (5.88-6.65, 6.18) on blind side; length of longest dorsal fin ray 2.03 (1.81-2.11, 1.96), length of longest anal fin ray 1.97 (1.77-2.09, 1.92); length of middle caudal fin ray 1.25 (1.16-1.42, 1.25); curved length of lateral line 1.54 (1.53-1.95, 1.77).

Source : MNHN, Paris

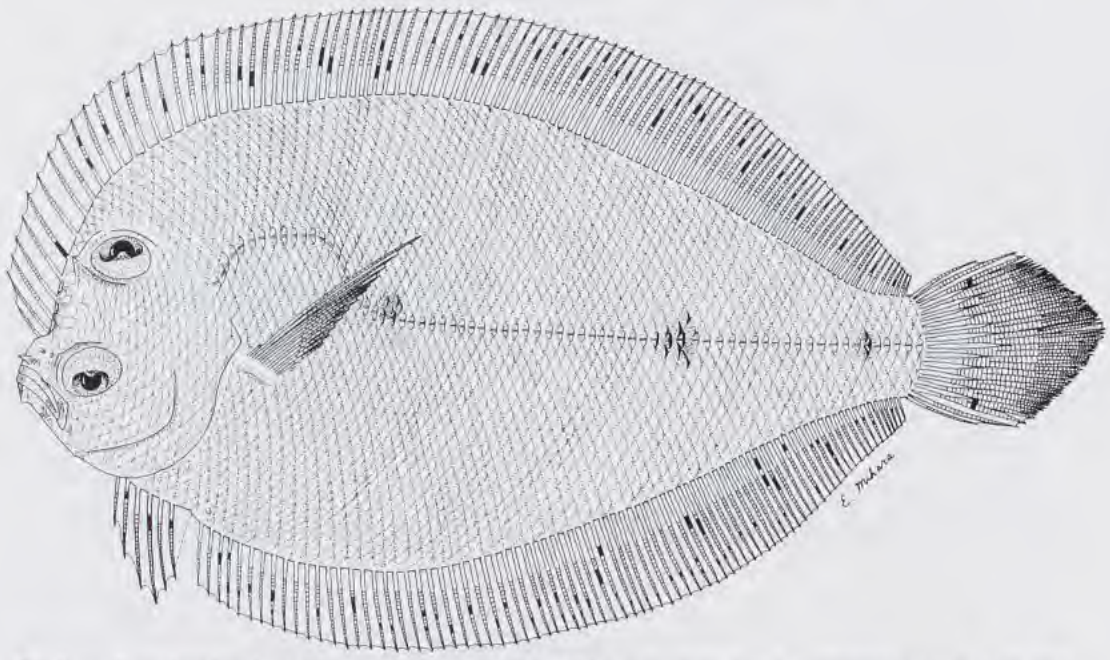

FIG. 8. — *Tosarhombus brevis* sp. nov., holotype, male, 133.4 mm, from New Caledonia (MNHN 1994-347).

Body deeply ovate, deepest point slightly in front of middle part of body, depth 1.56-2.06 times of head length; dorsal and ventral contours gently arched. Caudal peduncle deep, its depth about 19-24 % of body depth. Head large; upper profile with a large notch in front of upper margin of lower eye, steep in males, not so in females and youngs (Figs 9, 10). Slightly protruding snout 50-74 % of upper eye diameter. A strong rostral spine in males, absent or feeble in females and youngs (Fig. 10). Eyes large, upper eye diameter 84-102 % of upper jaw length on ocular side; lower eye in advance of upper. A strong orbital spine anterior to upper eye in males, absent in females and youngs (Fig. 10). Interorbital region concave, becoming wider with increasing body size, wider in males than in females and youngs (Figs 5, 9, 10). Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril tubular with posterior flap; nostrils on blind side small, below origin of dorsal fin, similar in shape to ocular side ones. Mouth large, oblique; maxilla extending to below anterior 1/3 part of lower eye; anterior tips of both jaws nearly on same vertical line when mouth closed. Small ventral knob at symphysis and posteroventral corner of mandible. Teeth on upper jaw sharp, uniserial, becoming larger and more widely spaced anteriorly with some anterior canine-like teeth. Lower jaw teeth uniserial, nearly similar to anterior teeth of upper jaw in terms of size and spacing. Gill rakers on first arch slender, not serrate, absent on upper limb. Scales on ocular side large, with rather short ctenii (Fig. 4B); snout, both jaws and pectoral fin on ocular side naked; cycloid scales on blind side. Lateral line curved above pectoral fin on ocular side, absent on blind side. Dorsal fin origin on blind side, on horizontal line through upper margin of lower eye. Anal fin origin below posterior margin of head. Pectoral fin on ocular side slightly prolonged in males, less so in females and youngs (Figs 9, 10), second ray longest, longer than blind side fin. Pelvic fins with 6 rays, base on ocular side longer than blind side base, third or fourth rays on ocular side opposite to first ray on blind side. Tip of isthmus below posterior margin of lower eye. All fin rays simple except caudal fin rays. Caudal fin rays branched except for two upper- and lowermost rays. Vent opens on blind side, immediately above first anal fin ray. Urogenital papilla on opposite side of vent.

Coloration (in alcohol). Body color on ocular side light brown; a series of three or four indistinct white blotches along head margin in front of interorbital space and upper eye in larger specimens, absent in youngs; not delimited dark blotch at junction of straight and curved parts of lateral line, two dark blotches on straight portion of lateral line. Blind side pale yellowish white. Dorsal and anal fins with a series of dark spots; pelvic fin with scattered small dark spots.

Source : MNHN, Paris

Sexual dimorphism. This species shows sexual dimorphism in the presence or absence of rostral and orbital spines (Fig. 10), interorbital width (Figs 5, 10), the length of the pectoral fin on the ocular side (Fig. 10), and the curvature of the anterior dorsal profile (Figs 9, 10).

DISTRIBUTION. — The specimens were collected from the Lifou Island, northern and southern waters of New Caledonia, at depths of 250-320 m.

ETYMOLOGY. — Named for its stocky body (from latin *brevis* meaning short).

REMARKS. — This new species most closely resembles *T. longimanus* sp. nov. in having uniserial upper jaw teeth, light brown body on the ocular side and small numbers of meristic counts (Table 3), but differs from the latter in having a deeper body (Fig. 7) and a narrower interorbital region in either sexes (Fig. 5), a shorter upper jaw on the ocular side (2.78-3.06 in head length vs 2.44-2.75 in *T. longimanus*), a shorter pectoral fin on the ocular side in males, a rather longer pelvic fin on the ocular side, and rather large number of vertebrae (Table 3).

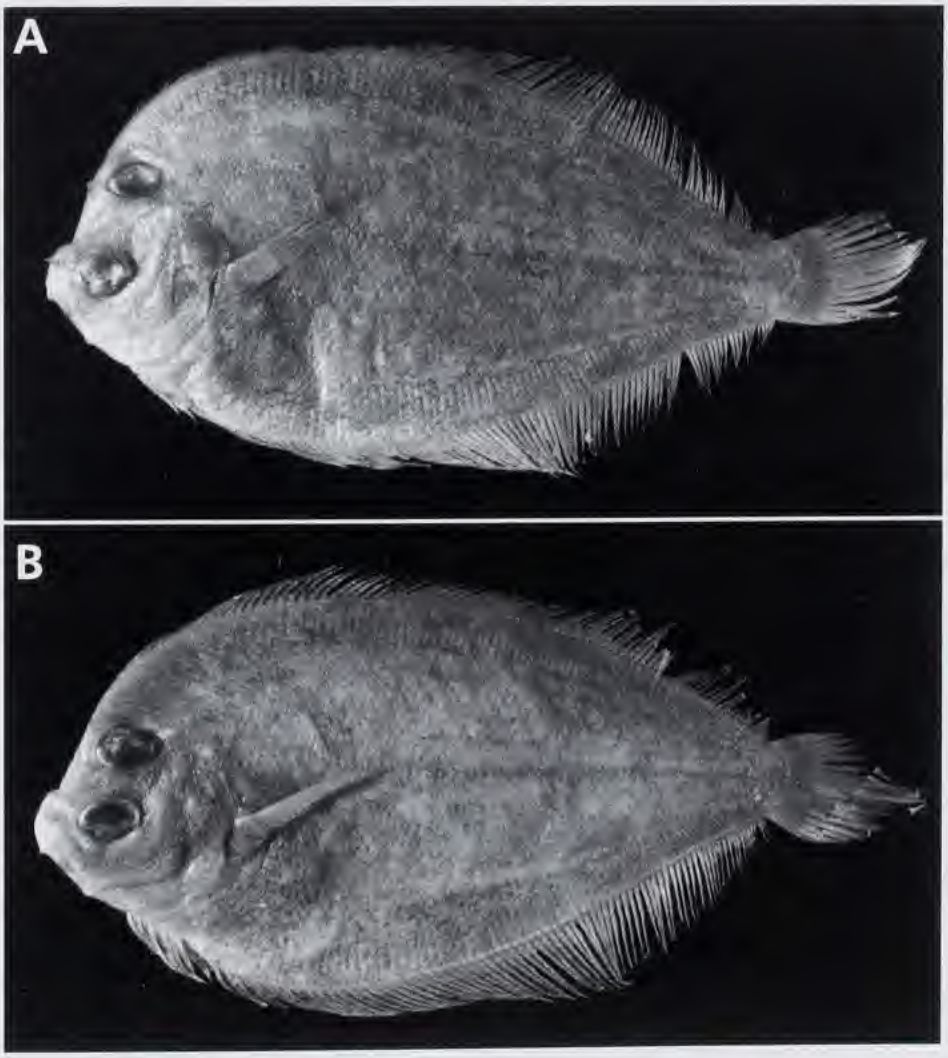

FIG. 9. — *Tosarhombus brevis* sp. nov. — **A**: holotype, male, 133.4 mm, from New Caledonia (MNHN 1994-347). — **B**: paratype, female, 112.5 mm, from New Caledonia (MNHN 1994-348).

Source : MNHN, Paris

TABLE 5. — Frequency distribution of eight meristic characters of *Tosarhombus brevis* sp. nov. Counts for holotype included in boldfaced numbers.

Dorsal fin rays

97	98	99	100	101	102	103	104
1	0	2	2	2	**3**	0	1

Anal fin rays

77	78	79	80	81	82	83
2	0	3	2	**1**	1	2

Pectoral fin rays

9	10	11	12	13	14
0(1)	0(4)	0(**6**)	5(0)	**5**(0)	1(0)

Caudal fin rays

2+13+2	2+14+2
10	1

Scales in lateral line

64	65	66	67	68	69	70	71
3	1	0	0	2	2	0	**2**

Gill rakers

1+7	0+7	0+8	0+9
1	**4**	5	1

Vertebrae

10+30	10+31	10+32
1	9	**1**

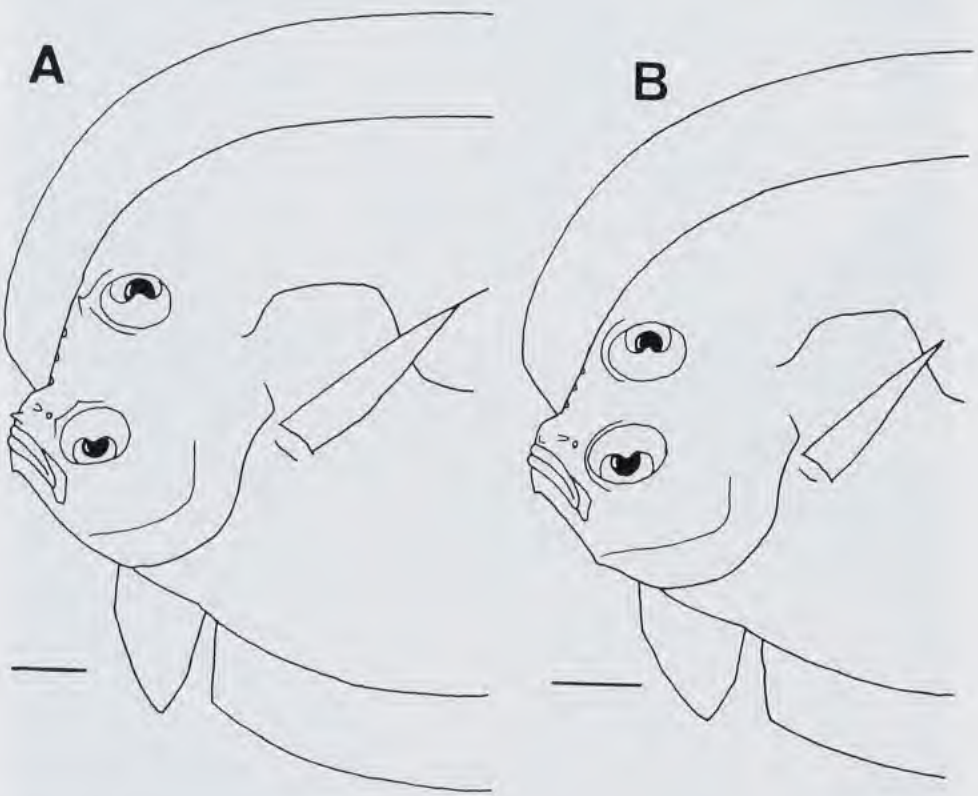

FIG. 10. — Diagrammatic illustration of body parts showing sexual dimorphism in male (A) and female (B) in *Tosarhombus brevis* sp. nov. Scale bars indicate 10 mm.

Source : MNHN, Paris

Genus *PARABOTHUS* Norman, 1931

Parabothus Norman, 1931: 600 (type species: *Arnoglossus polylepis* Alcock, 1889, by original designation).

DIAGNOSIS. — Body elliptical. Tip of isthmus below posterior margin of lower eye. Blunt rostral knob rarely found only in males, barely obvious or absent in females. Interorbital space narrowly concave, becoming wider with increasing size, wider in males than in females. Dentition about equally developed on both sides of jaw. Scales on ocular side with short or moderate ctenii or cycloid. Lateral line developed only on ocular side. Pelvic fin on ocular side originating at tip of isthmus; base on ocular side longer than blind side base. Three infraorbital bones on blind side. Four caudal plates (i.e., parhypural, two hypurals, and hypural + epural) without subdivisions.

REMARKS. — This genus closely resembles *Tosarhombus*, *Arnoglossus* and *Psettina* in having an elliptical body and caudal plates lacking subdivisions. However, it differs from *Tosarhombus* in having a narrower interorbital region, shallower body and head margin of uniform color (some white blotches along head margin in the latter), and from *Arnoglossus* and *Psettina* in having wider interorbital region and sexual dimorphism observed in the interorbital width. *Arnoglossus* and *Psettina* have a bony ridge and less often, a narrow concave area between the eyes. Also no sexual dimorphism is found in the interorbital width in these two genera. In addition, *Parabothus* is easily distinguishable from *Psettina* in having cycloid or ctenoid scales with short spinules. *Psettina* has ctenoid scales with elongate spinules. NORMAN (1934) and AMAOKA (1969) have indicated that the genus *Parabothus* lacks a rostral spine. This character eliminated from the generic definition because *P. amaokai* Parin, 1983, *P. taiwanensis* Amaoka & Shen, 1994 and *P. filipes* sp. nov. have a blunt rostral knob at least in males.

COMPARATIVE MATERIAL. — *P. chlorospilus*: USNM uncat., 3 males and 5 females 69.1-180.8 mm, 21°09.7'N, 157°29.8'W, Hawaii, 177-183 m, 7 April 1968. — USNM uncat., 5 males and 5 females 71.0-182.8 mm, 21°09.6'N, 157°24.6'W, Hawaii, 181-188 m, 5 May 1968. — USNM uncat., 2 males 137.4-154.5 mm, 20°57.1'N, 156°47.1'W, Hawaii, 205-214 m, 14 November 1967.

P. coarctatus: FAKU 33342-33362, 13 males and 8 females 100.2-224.8 mm, Mimase, Kochi Pref., 15 December 1959.

P. malhensis: HUMZ 72351, 1 male 177.5 mm, 11°10'S, 60°08'E, Saya de Malha Bank, 191 m, 31 August 1977. — HUMZ 74000, 74001-74010, 74206, 74211, 3 males, 9 females and 1 young, 103.0-165.0 mm, 11°03'S, 61°15'E, Saya de Malha Bank, 254 m, 31 August 1977.

P. kiensis: FAKU 33298, 33299, 33301-33303, 33306-33311, 33313-33341, 33822, 24 males and 18 females 104.7-192.6 mm SL, Mimase, Kochi Pref., 15 December 1959.

P. amaokai: HUMZ 110064, paratype, 1 female 191.1 mm, 25°41.2'S, 85°24.1'W, 22 November 1983.

Psettina profunda: ZMA 109-393, syntype, 1 male 87.5 mm, Timor Sea (9°0.3'S, 126°24.5'E), 112 m, 20 January 1900. — ZMA 109-394, syntype, 1 female, 69.4 mm, Madura Sea (7°2.6'S, 115°23.6'E), 100 m, 15 March 1899.

KEY TO NEW CALEDONIAN SPECIES OF *PARABOTHUS*

1 Gill rakers serrate (Fig. 13C); pelvic fin of ocular side greatly elongated in males, its length much more than half of head in male specimens of more than 50 mm SL; a few irregular dark bands in front of both eyes and interorbital region in mature specimens; a ventral rostral knob near snout tip in males; lateral line scales-56-66; dorsal fin rays 90-96; anal fin rays 69-75 ..... ***P. filipes* sp. nov.**

1' Gill rakers not serrate; pelvic fins not elongated in both sexes, its length much less than half of head; three white bands below upper eye in mature specimens; rostral knob absent; lateral line scales 80-99; dorsal fin rays 104-119; anal fin rays 83-98 ..... **2**

Source : MNHN, Paris

2 Caudal fin with dark pigment near middle of rays; no conspicuous blotches on straight portion of lateral line; a few dark spots along each of dorsal and ventral margins on ocular side of body; interorbital region wide in large specimens (Fig. 16) ..... ***P. kiensis***

2' Caudal fin without particular markings; three not delimitated dark blotches on lateral line; many dark spots and rings irregularly scattered on ocular side of body; interorbital region narrow (Fig. 18) ..... ***P. coarctatus***

Parabothus filipes sp. nov.

Figs 11-15; Tables 6-8

MATERIAL EXAMINED. — 31 specimens (15 males and 16 females).

Chesterfield and Bellona Plateaus. CHALCAL 1: stn CP 17, 22°34.70'S, 159°15.30'E (Nova Bank), 300 m, beam trawl, R. V. *"Coriolis"*, 28 July 1984: holotype, male 79.9 mm (MNHN 1994-360). — Stn CP 17, 22°34.70'S, 159°15.30'E (Nova Bank), 300 m, beam trawl, 28 July 1984: 29 paratypes, 11 males and 13 females 40.5-80.3 mm (MNHN 1994-350 to 374); 3 males and 2 females 62.0-88.0 mm (HUMZ 129479 to 129483). — Stn CH 2, 22°34.41'S, 159°17.39'E (Nova Bank), 330 m, otter trawl (fishes), 28 July 1984: 1 paratype, female 73.5 mm (HUMZ 129478).

DIAGNOSIS. — Pelvic fin on ocular side greatly elongated in males, about 0.8-1.5 in head length in male specimens of more than 50 mm SL (Fig. 15); gill rakers long and serrated; a few irregular dark bands in front of both eyes and interorbital region; a poorly developed rostral spine near snout tip above maxilla in males; scales in lateral line 56-66; dorsal fin rays 90-96; anal fin rays 69-75.

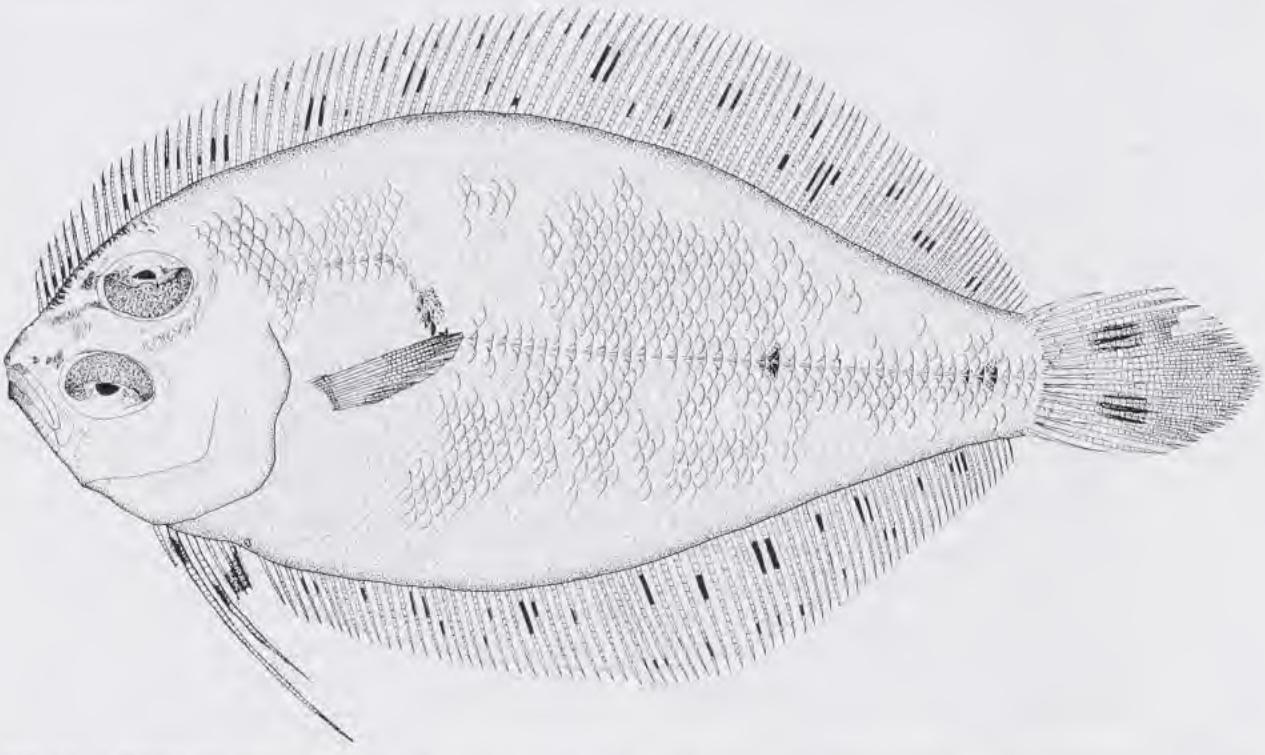

FIG. 11. — *Parabothus filipes* sp. nov., holotype, male, 79.9 mm, from Nova Bank, west of New Caledonia (MNHN 1994-360).

Source : MNHN, Paris

TABLE 6. — Frequency distribution of eight meristic characters of *Parabothus filipes* sp. nov. Counts for holotype included in boldfaced numbers.

Dorsal fin rays							Anal fin rays							Vertebrae		
90	91	92	93	94	95	96	69	70	71	72	73	74	75	10+29	10+30	10+31
2	4	6	**6**	7	5	1	2	1	3	5	8	**9**	3	3	**23**	5

Pectoral fin rays							Caudal fin rays			
7	8	9	10	11	12	13	2+13+2	3+11+3	2+12+3	3+12+2
0(1)	0(19)	0(**9**)	1(1)	1(0)	19(0)	**10**(0)	**11**	13	3	4

Scales in lateral line											Gill rakers			
56	57	58	59	60	61	62	63	64	65	66	0+7	0+8	0+9	0+10
2	0	**2**	6	7	4	6	1	1	0	1	3	**15**	12	1

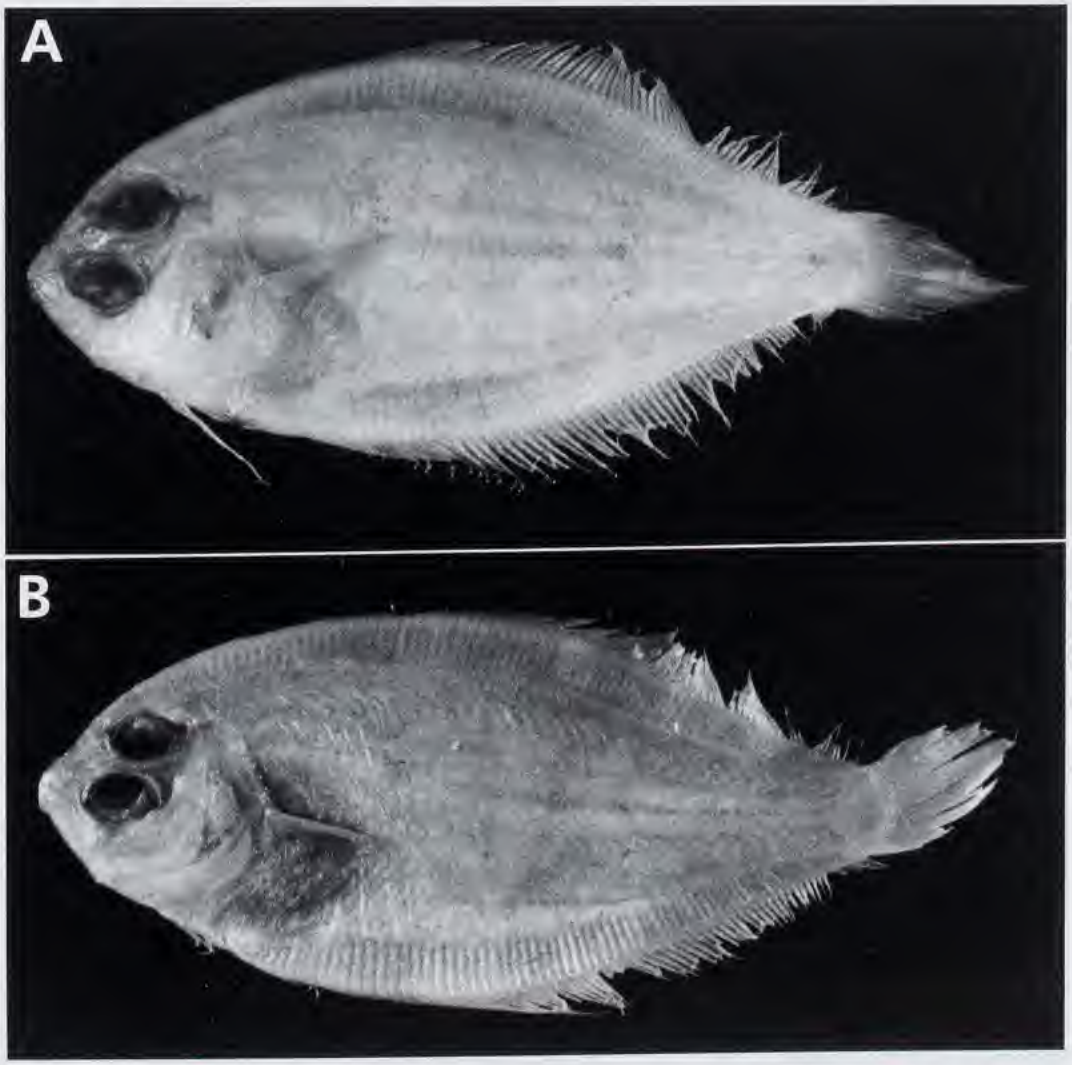

FIG. 12. — *Parabothus filipes* sp. nov. — **A**: holotype, male, 79.9 mm, from Nova Bank, west of New Caledonia (MNHN 1994-360). — **B**: paratype, female, 73.4 mm, from Nova Bank, west of New Caledonia (MNHN 1994-369).

Source : MNHN, Paris

DESCRIPTION. — Data for holotype are given first, followed in parentheses by ranges for the paratypes and averages including holotype for proportional data. Counts and proportional measurements as percent of SL are shown in Tables 6 and 7. Head length 3.57 in SL (3.47-3.91, 3.67); body depth 2.21 (2.15-2.56, 2.30). Snout length 5.74 in head length (4.65-5.89, 5.23); upper eye diameter 2.99 (2.82-3.40, 3.02); lower eye diameter 3.15 (2.86-3.46, 3.08); interorbital width 9.74 (9.19-37.33, 14.53) in males, (21.56-35.67, 28.27) in females; upper jaw length 2.80 (2.47-2.85, 2.64) on ocular side, 2.73 (2.47-2.80, 2.61) on blind side; lower jaw length 2.13 (1.95-2.25, 2.07) on ocular side, 1.98 (1.80-2.05, 1.92) on blind side; depth of caudal peduncle 2.55 (2.26-2.84, 2.60); pectoral fin length 1.68 (1.60-1.81, 1.71) on ocular side, 2.60 (2.53-3.61, 2.95) on blind side; pelvic fin length 1.01 (0.78-3.61, 1.40) on ocular side in males, (2.73-3.30, 3.03) in females, 2.95 (2.82-3.48, 3.07) on blind side; pelvic fin base length 3.67 (3.06-4.22, 3.67) on ocular side, 8.30 (7.48-10.00, 8.55) on blind side; length of longest dorsal fin ray 2.41 (2.18-2.48, 2.36); length of longest anal fin ray 2.24 (2.05-2.32, 2.23); length of middle caudal fin ray 1.25 (1.20-1.37, 1.27); curved length of lateral line 2.11 (1.72-2.25, 1.95).

TABLE 7. — Proportional measurements as % of SL in *Parabothus filipes* sp. nov. Averages include measurements from holotype.

Character	Holotype	Paratypes	Average	SD
SL (mm)	79.9	40.5-88.0	64.1	12.2
HL	28.0	25.6-28.8	27.3	0.8
BD	45.3	39.1-46.5	43.6	1.6
SNL	4.9	4.5-6.0	5.2	0.3
UED	9.4	8.4-9.8	9.0	0.4
LED	8.9	8.1-9.8	8.9	0.4
IW (M)	2.9	0.7-3.0	2.2	0.7
IW (F)		0.7-1.2	1.0	0.2
UJL (O)	10.0	9.5-11.2	10.4	0.4
UJL (B)	10.3	9.7-11.5	10.5	0.4
LJL (O)	13.1	12.3-13.8	13.2	0.4
LJL (B)	14.1	13.4-15.2	14.2	0.4
DCP	11.0	9.5-11.3	10.5	0.5
P1L (O)	16.6	15.1-17.0	16.0	0.5
P1L (B)	10.8	7.6-10.8	9.3	0.8
P2L (O, M)	27.7	7.6-35.7	24.0	7.4
P2L (O, F)		8.2-9.7	9.0	0.4
P2L (B)	9.5	7.7-9.7	8.9	0.5
P2B (O)	7.6	6.8-9.1	7.5	0.4
P2B (B)	3.4	2.7-3.5	3.2	0.2
LDFR	11.6	11.0-12.3	11.6	0.4
LAFR	12.5	11.4-13.0	12.3	0.4
MCFR	22.4	19.7-23.4	21.5	0.8
LLCW	13.3	12.5-15.7	14.0	0.7

Body elongated and elliptical, deepest point near middle of body, its depth 1.43-1.74 times of head length; the dorsal and ventral contours gently arched. Caudal peduncle deep, its depth 22.0-27.8 % of body depth. Head slightlylonger than 1/4 of SL; upper profile with very slight concavity in front of lower margin of upper eye. Snout blunt, its length 51.4-71.0 % of upper eye diameter. Feeble, obtuse rostral spine near snout tip above maxilla in males, directed downward, absent in females (Figs 12, 13A-B). Eyes large, upper eye diameter 78.8-95.0 % of

Source : MNHN, Paris

upper jaw length on ocular side, lower eye in advance of upper. Interorbital region shallowly concave, becoming wider with increasing body size, wider in males than in females (Figs 12, 13A-B, 14). Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril tubular with posterior flap; nostrils on blind side small, below origin of dorsal fin, similar in shape to those on ocular side. Mouth large, oblique; maxilla extending beyond anterior margin of lower eye; anterior tip of both jaws nearly on same vertical line when mouth closed. A small ventral knob at mandibular symphysis. Dentition almost equally developed on both jaws; teeth on upper jaw sharp, uniserial, closely spaced laterally, becoming larger and more widely spaced anteriorly, some anterior canine like teeth; lower jaw teeth uniserial, nearly similar to anterior teeth of upper jaw in size and spacing. Gill rakers on first arch long, posterior margins serrated (Fig. 13C), none on upper limb. Scales large, with short ctenii on ocular side (Fig. 13D); snout, middle part of interorbital region and anterior parts of both jaws naked; cycloid scales on blind side. Lateral line curved anteriorly on ocular side, absent on blind side. Dorsal fin origin on blind side, on horizontal line through lower margin of upper eye. Anal fin origin below posterior margin of head. Pectoral fin on ocular side not elongated in both sexes, its length 1.50-2.03 times as long as that on blind side. Pelvic fin on ocular side originating at tip of isthmus; second and third rays greatly elongated in males, the second ray longest, becoming longer with increasing body size in males, longer in males than in females (Figs 12, 13A-B, 15); fourth ray on ocular side opposite to first ray on blind side. Tip of isthmus below posterior margin of lower eye. All fin rays simple except for caudal fin rays. Caudal fin with rounded margin; all rays branched except for two or three upper- and lowermost rays. Posterior basipterygial process well projecting between pelvic fins. Vent opens on blind side, immediately anterior to first anal fin ray. Urogenital papilla on opposite side of vent.

Coloration (in alcohol). Body color on both sides pale brown; snout margin, anterior parts of both jaws, and dorsal margin of head stained with dark, a few irregular dark bands in front of orbital region in larger specimens (Fig. 13AB); an obscure dark spot at junction of straight and curved parts of lateral line, one spot on middle of straight and another on near caudal-fin base. Caudal fin with a pair of not well delimited dark blotches in middle; dorsal and anal fins with a series of dark spots of variable size; pelvic fin with two dark spots, one on fin membrane between first and second rays and another between fourth and sixth rays (Fig. 11).

Sexual dimorphism. Parabothus filipes sp. nov. shows sexual dimorphism in the presence or absence of rostral spine, the interorbital width and length of the pelvic fin on ocular side (Figs 12, 13AB, 14, 15).

DISTRIBUTION. — The specimens were collected from the Nova Bank, the Coral Sea, at depths of 300-330 m.

ETYMOLOGY. — Named for the elongated pelvic fin on the ocular side in males, which is one of diagnostic character of this species.

REMARKS. — The present species is closely related to species of the genus *Parabothus*: elongated elliptical body; clearly concave and narrow interorbital space (a bony ridge in the youngs), broader in males than in females; mouth moderate, the length of maxilla 2.5-2.9 in head length; ctenii on scales not elongated; 4 caudal plates without subdivisions (NORMAN, 1934; AMAOKA, 1969; AMAOKA & SHEN, 1993). There are eight valid species in the genus *Parabothus: P. coarctatus* (Gilbert, 1905), *P. kiensis* (Tanaka, 1918), *P. polylepis* (Alcock, 1889), *P. chlorospilus* (Gilbert, 1905), *P. malhensis* (Regan, 1908), *P. budkeri* (Chabanaud, 1942), *P. amaokai* Parin, 1983 and *P. taiwanensis* Amaoka & Shen, 1993, except for *P. thackwrayi* Smith, 1967 that is shown to be a larva of *Laeops pectoralis* (Bonde, 1922) (HENSLEY, 1986).

P. filipes sp. nov. is easily separable from other known congeners in having an elongated pelvic fin on the ocular side in males, a low number of scales in the lateral line (Table 8), gill rakers with serrate margins, and a few irregular dark bands in front of both eyes and interorbital region in mature specimens. *P. taiwanensis* has a low number of scales on the lateral line (61-62), but it is clearly separable from the latter by the presence of uniserial upper jaw teeth (biserial in *P. taiwanensis*), feebly ctenoid scales on the ocular side (scales with long ctenii), gill rakers with serrated margins (gill rakers with smooth margins), and lower numbers of dorsal and anal fin rays (Table 8). *P. malhensis* has gill rakers that are similar to the ones found in *P. filipes*. However, *P. malhensis* has cycloid scales on both sides of the body and high numbers of the meristic counts, while *P. filipes* has ctenoid scales on the ocular side and lower meristic counts (Table 8). On the other hand, this species superficially resembles *Psettina profunda* (Weber, 1913) from Java, Madura Sea and Timor Sea, in the narrow concave interorbital space

Source : MNHN, Paris

and the elongated pelvic fin in males, and also in the numbers of dorsal fin rays (94-95 in the latter), anal fin rays (73-75), and scales in the lateral line (57-59), but differs from the latter in the following characters: serrated gill rakers, somewhat broader interorbital space, moderate length of ctenii of scales and uniserial tooth row in both jaws (biserial in upper jaw anteriorly).

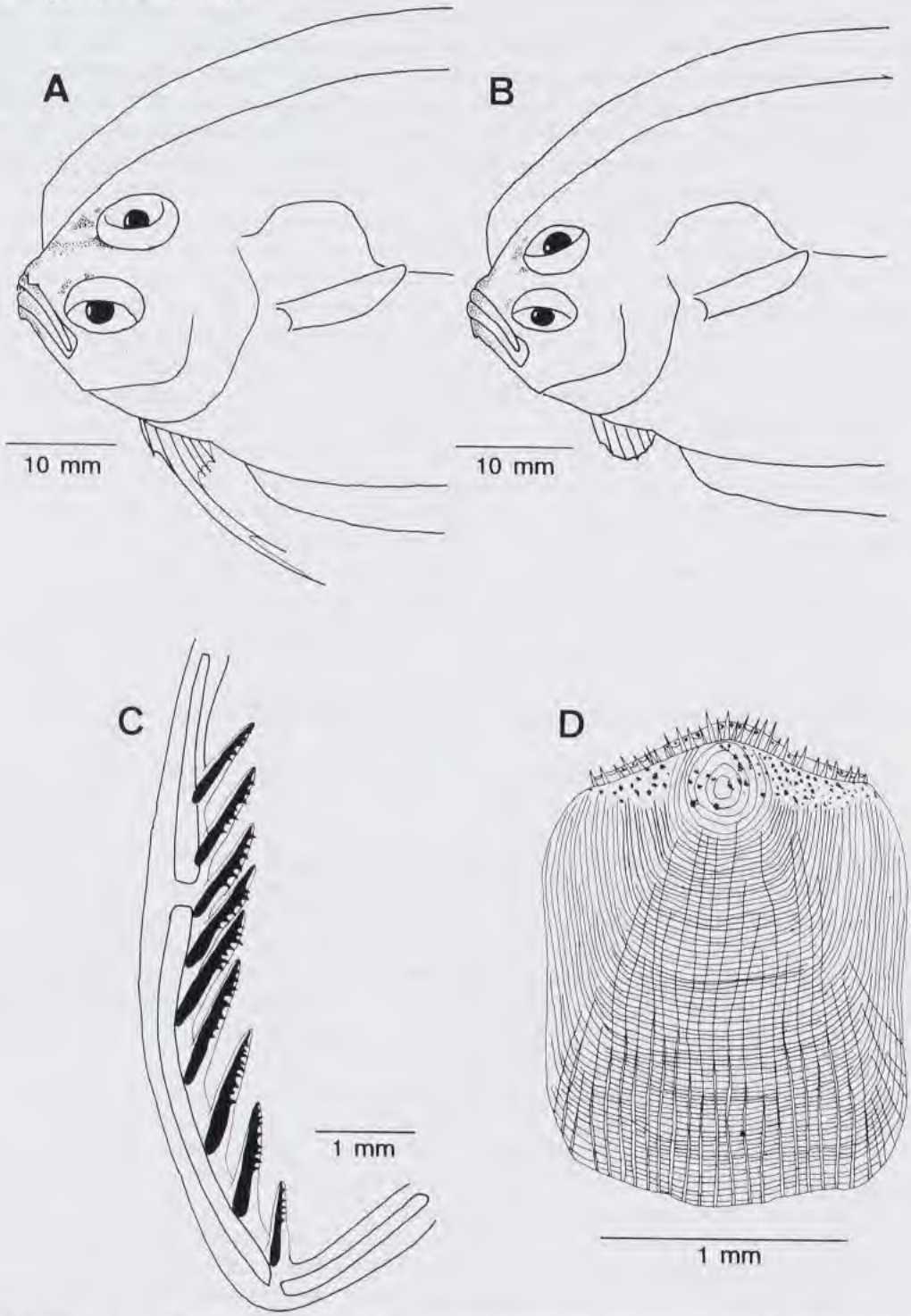

FIG. 13. — Body parts showing sexual dimorphism in male (A) and female (B), and first gill arch (C) and a scale (D) from ocular side in *Parabothus filipes* sp. nov., paratype, 74.1 mm (HUMZ 129482).

Source : MNHN, Paris

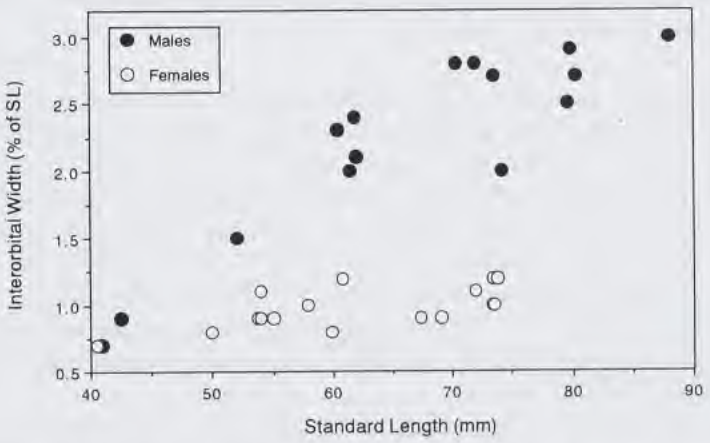

FIG. 14. — Relationships between SL and interorbital width in percent of SL in *Parabothus filipes* sp. nov.

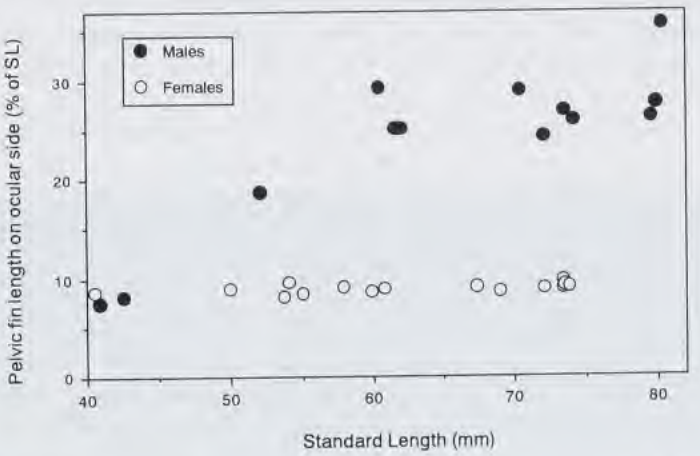

FIG. 15. — Relationships between SL and pelvic fin length on ocular side in percent of SL in *Parabothus filipes* sp. nov.

Parabothus kiensis (Tanaka, 1918)

Figs 16-17; Tables 8-10

Platophrys kiensis Tanaka, 1918: 225.

Platophrys kiensis: — UI, 1929: 272, fig. 102. — KAMOHARA, 1934: 301.

Parabothus kiensis: OKADA & MATSUBARA, 1938: 423. — KAMOHARA, 1950: 241. — MATSUBARA, 1955: 1261. — KAMOHARA, 1958: 62. — OCHIAI & AMAOKA 1963: 133. — KAMOHARA, 1964: 82. — AMAOKA, 1969: 125, fig. 33-35. — AMAOKA, 1984: 384, pl. 312-H. — NAKABO, 1993: 1168.

MATERIAL EXAMINED. — 7 specimens (3 males and 4 females).

New Caledonia BIOCAL: stn CP 110, 22°13.31'S, 167°09.93'E, 275-320 m, beam trawl, R. V. *"Jean Charcot"*, 9 September 1985: 1 male 96.5 mm (MNHN 1994-375).

MUSORSTOM 4: stn CP 172, 19°01.20'S, 163°16.00'E, 275-330 m, beam trawl, R. V. *"Vauban"*, 17 September 1985: 1 male and 2 females 72.0-81.0 mm (MNHN 1994-377, 378, 379); 1 female 87.7 mm (HUMZ 129484). — Stn CP 192, 18°59.30'S, 163°25.00'E, 320 m, beam trawl, 19 September 1985: 1 female 98.3 mm (MNHN 1994-376); 1 male 170.5 mm (HUMZ 129485).

Source : MNHN, Paris

DIAGNOSIS. — Caudal fin stained with dark pigments on middle rays; no distinct blotches on lateral line; 80-88 scales in lateral line; gill rakers without serration.

DESCRIPTION. — Ranges for proportional data are given first, followed by averages. Counts and proportional measurements as percent of SL are shown in Tables 9 and 10. Head length 3.65-3.89, 3.80 in SL; body depth 2.44-2.82, 2.69. Snout length 4.54-5.27, 4.78 in head length; upper eye diameter 2.75-3.44, 3.03; lower eye diameter 2.79-3.16, 3.08; interorbital width 4.89-37.80, 22.80 in males, 33.00-41.60, 36.56 in females; upper jaw length 2.67-2.92, 2.76 on ocular side, 2.59-2.66, 2.63 on blind side; lower jaw length 1.96-2.07, 2.03 on ocular side, 1.86-1.93, 1.90 on blind side; depth of caudal peduncle 2.68-3.02, 2.89; pectoral fin length 1.68-1.89, 1.82 on ocular side, 2.95-4.00, 3.66 on blind side; pelvic fin length 3.15-3.52, 3.31 on ocular side, 3.15-3.58, 3.28 on blind side; pelvic fin base length 3.44-3.96, 3.69 on ocular side, 6.10-7.04, 6.48 on blind side; length of longest dorsal fin ray 2.10-2.30, 2.25; length of longest anal fin ray 1.91-2.24, 2.12; length of middle caudal fin ray 1.34-1.50, 1.41; curved length of lateral line 1.81-2.07, 1.91.

Body elongated and elliptical, deepest point at about middle of body, its depth 1.34-1.59 times as long as head length; dorsal and ventral contours gently arched. Caudal peduncle deep, its depth 23.5-26.3 % of body depth. Head large, upper profile with a concavity in front of lower margin of upper eye. Snout blunt, and long, its length 58.5-75.8 % of upper eye diameter. Rostral or orbital spines absent. Eyes large; upper eye diameter 77.6-101.5 % of upper jaw length on ocular side, lower eye in advance of upper eye. Interorbital region shallowly concave, becoming wider proportionally with increasing body size, wider in males than in females. Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril tubular with posterior flap; nostrils on blind side small, below origin of dorsal fin, similar in shape to those on ocular side. Mouth large, oblique; maxilla extending beyond anterior margin of lower eye; anterior tips of both jaws nearly on a same vertical line when mouth closed. A small ventral knob at mandibular symphysis. Dentition about equally developed on both jaws; teeth on upper jaw sharp, uniserial, becoming larger and more widely spaced anteriorly, few anterior canine-like teeth; lower jaw teeth uniserial, almost similar to anterior teeth of upper jaw in terms of size and spacing. Gill rakers on first arch long or moderate in size, not serrate, absent on upper limb. Scales on ocular side ctenoid with moderate ctenii (Fig. 17). No scales on snout, marginal portions of both eyes, anterior parts of both jaws and basal part of pectoral fins; cycloid scales on blind side. Lateral line curved above pectoral fin on ocular side; absent on blind side. Dorsal fin origin on blind side, on horizontal line through upper margin of lower eye. Anal fin origin below posterior margin of head. Pectoral fin on ocular side not elongated in both sexes, its length 1.76-2.12 times as long as that on blind side. Pelvic fin on ocular side originating at slightly posterior to tip of isthmus, shorter than head length; third ray on ocular side nearly opposite to first ray on blind side. Tip of isthmus usually more posterior than vertical line through posterior margin of lower eye. All fin rays except for caudal fin rays, simple. Caudal fin rays branched except for two upper- and lowermost rays. Vent opens on blind side, immediately anterior to first anal fin rays. Urogenital papilla on opposite side of vent.

Coloration (in alcohol). Body color on ocular side light brown; three white bands below upper eye in larger specimens; anterior band running from anterior margin of upper eye, middle one from anterior 1/5 of upper eye downward to anterior margin of lower eye and posterior one from posterior 1/5 of upper eye downward to posterior 1/4 of lower eye; a diffused dark blotch above junction of straight and curved parts of lateral line; a few dark spots along each of dorsal and ventral margins of body. Blind side pale yellowish white except for light brown margin of body. Dorsal and anal fins with a series of dark spots; caudal fin stained with dark on middle rays; pelvic fin with a dark spot.

Sexual dimorphism. This species shows sexual dimorphism only in the interorbital width.

DISTRIBUTION. — Southern Japan and the Coral Sea, at depths of 275-330 m.

Source : MNHN, Paris

TABLE 8. — Comparison of proportional measurements and meristic counts for ten *Parabothus* species. — N: NORMAN (1934); A: AMAOKA (1969); A & I: AMAOKA & MAMURA (1990); C: CHABANAUD (1942); P: PARIN (1942); A & S: AMAOKA & SHEN (in press); OR: original.

	No.	SL (mm)	P2L (O, in HL)	D	A	LLS	V	GR	Sources
P. filipes	31	40.5-88.0	0.78-3.61 (M) 2.73-3.30 (F)	90-96	69-75	56-66	10+29-31	0+7-10	OR
P. polylepis	2	80-130	-	83	63-66	82-85	-	?+8-9	N
P. chlorospilus	22	69.1-182.8	2.85-3.27	103-113	84-94	83-90	10+30-32	0+9-10	OR + N
P. coarctatus	21	100.2-224.8	2.73-3.23	106-117	87-95	90-96	10+32-33	0+8-10	A
	7	50.9-180.8	2.68-3.24	113-118	95-98	88-99	9-10+32-35	0+8-11	OR
P. malhensis	14	102.2-166.2	3.58-4.90	111-114	90-93	93-98	10+35-37	0+9-11	A & I
P. kiensis	40	105.8-202.9	2.44-3.76	104-113	83-90	80-86	10+31-32	0+7-10	A
	7	72.0-170.5	3.15-3.52	113-119	90-95	85-88	10+32-33	0+8-9	OR
P. budkeri	3	52-122	-	82-83	59-62	78-80	-	-	C
P. amaokai	2	110-191.1	2.45-3.4	103-105	87-89	70-75	10+30	0+15	OR + P
P. taiwanensis	5	80.4-148.5	2.56-2.93	100-107	78-84	61-62	10+28-29	0+8	A & S

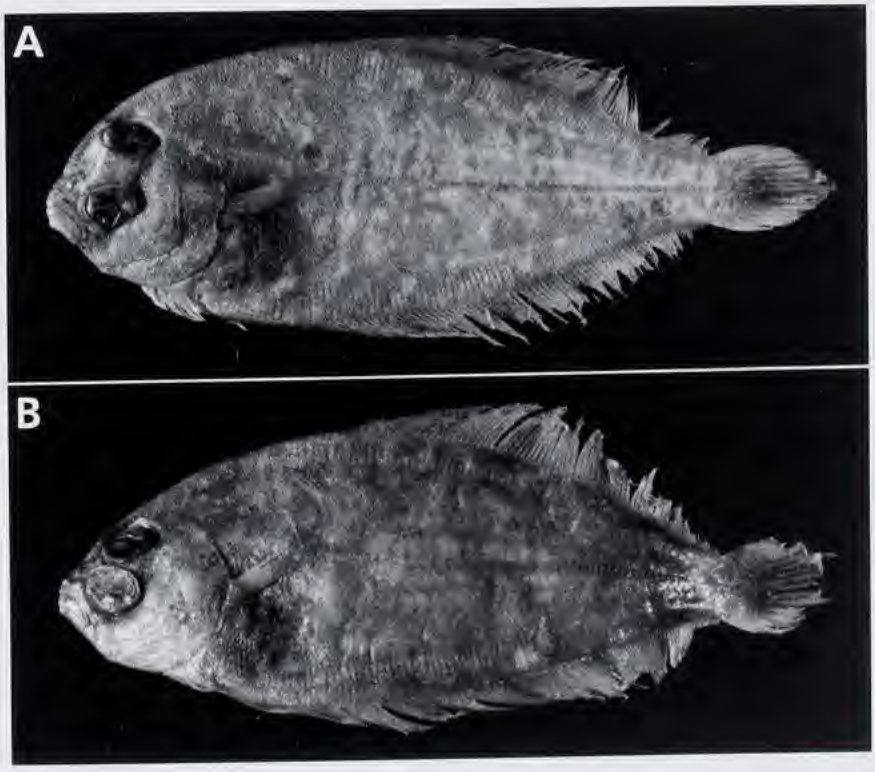

FIG. 16. — *Parabothus kiensis* (Tanaka, 1918). — **A**: male, 170.5 mm, from New Caledonia (HUMZ 129485). — **B**: female, 87.7 mm, from New Caledonia (HUMZ 129484).

Source : MNHN, Paris

REMARKS. — Specimens from Coral Sea were compared with Japanese specimens. They have more or less larger numbers of dorsal and anal fin rays and scales in lateral line, somewhat short ctenii on scales (Fig. 17), and a wide interorbital space in the largest specimen (when compared with specimen of about same size). These differences do not seem to be meaningful in delimiting species for the following reasons: the three meristic counts and the length of ctenii of scales have geographical variations in other some species of Bothidae and the interorbital width is quite variable in large specimens. This species has been previously known only from southern Japan. This is the first record for the Coral Sea.

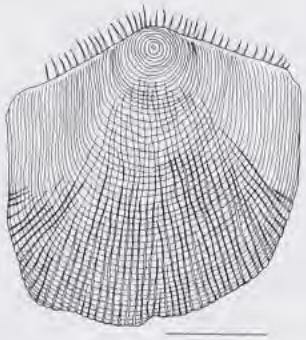

FIG. 17. — A scale from ocular side in *Parabothus kiensis* (Tanaka, 1918) (HUMZ 129485). Scale bar 1 mm.

TABLE 9. — Frequency distribution of eight meristic characters of *Parabothus kiensis* (Tanaka, 1918).

Dorsal fin rays							Anal fin rays					
113	114	115	116	117	118	119	90	91	92	93	94	95
1	1	1	0	2	1	1	1	1	0	1	3	1

Pectoral fin rays					Caudal fin rays
10	11	12	13	14	2+13+2
0(1)	0(6)	0(0)	5(0)	2(0)	7

Scales in lateral line				Gill rakers		Vertebrae	
85	86	87	88	0+8	0+9	10+32	10+33
1	4	1	1	5	2	6	1

Parabothus coarctatus (Gilbert, 1905)

Fig. 18; Tables 8, 11-12

Platophrys coarctatus Gilbert, 1905: 686, fig. 267.

Platophrys coarctatus : JORDAN & JORDAN, 1922: 24. — FOWLER, 1928: 92.

Rhomboidichthys coarctatus: GÜNTHER, 1909: 343.

Arnoglossus violaceus Franz, 1910: 61, pl. 7, fig. 56. — JORDAN, TANAKA & SNYDER, 1913: 315. — KAMOHARA, 1931: 542; 1938: 57; 1950: 239.

Parabothus coarctatus: NORMAN, 1931: 601; 1934: 243, fig. 185. — KAMOHARA, 1935: 21; 1950: 241; 1958: 62; 1964: 82. — OKADA & MATSUBARA, 1938: 423. — FOWLER, 1949: 61. — MATSUBARA, 1955: 1261. — AMAOKA, 1969: 121, figs 31-32; 1982: 296, 406, fig. 219; 1984: 348, pl. 321-F,G. — IWAI, 1976: 150, fig. M.Pat-24. — BORETS, 1983: 3. — FOROSHCHUK, 1991: 154. — NAKABO, 1993: 1168.

Parabothus (?) *violaceus*: NORMAN, 1931: 601.

Parabothus violaceus: NORMAN, 1934: 242, fig. 184. — OKADA & MATSUBARA, 1938: 423. — MATSUBARA, 1955: 1261. — KAMOHARA, 1958: 62; 1964: 82.

Source : MNHN, Paris

TABLE 10. — Proportional measurements as % of SL in *Parabothus kiensis* (Tanaka, 1918).

Character	Ranges (n = 7)	Average	SD
SL (mm)	72.0-170.5	96.94	34.1
HL	25.7-27.4	26.3	0.5
BD	35.4-40.9	37.3	1.8
SNL	5.2-5.7	5.5	0.2
UED	7.5-9.6	8.7	0.6
LED	7.2-9.4	8.6	0.7
IW (m)	0.7-5.3	2.3	2.1
IW (f)	0.6-0.8	0.7	0.1
UJL (O)	9.4-9.7	9.5	0.1
UJL (B)	9.8-10.3	10.0	0.2
LJL (O)	12.6-13.5	13.0	0.3
LJL (B)	13.4-14.2	13.9	0.3
DCP	8.8-9.6	9.1	0.3
P1L (O)	13.6-15.4	14.4	0.5
P1L (B)	6.4-8.7	7.3	0.8
P2L (O)	7.5-8.3	8.0	0.3
P2L (B)	7.4-8.3	8.0	0.3
P2B (O)	6.8-7.6	7.1	0.3
P2B (B)	3.8-4.3	4.1	0.2
LDFR	11.2-12.2	11.6	0.4
LAFR	11.7-13.6	12.4	0.6
MCFR	18.2-19.4	18.7	0.5
LLCW	13.2-14.5	13.8	0.4

MATERIAL EXAMINED. — 7 specimens (7 females).

New Caledonia. LAGON: stn 1153, 18°58.4'S, 163°23.0'E, 330-335 m, beam trawl, R. V. *"Vauban"*, 29 October 1989: 1 female 174.8 mm (HUMZ 129486).

Norfolk Ridge. CHALCAL 2: stn CH 4, 24°44.31'S, 168°09.94'E, 253 m, otter trawl (fishes), R. V. *"Coriolis"*, 27 October 1986: 1 female 174.8 mm (MNHN 1994-383). — Stn CP 19, 24°42.85'S, 168°09.73'E, 271 m, beam trawl, 27 October 1986: 1 female 180.8 mm (MNHN 1994-380). — Stn CP 20, 24°44.60'S, 168°09.30'E, 230-300 m, beam trawl, 27 October 1986: 1 female 164.0 mm (MNHN 1994-382). — Stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m, shrimp trawl, 28 October 1986: 1 female 167.7 mm (MNHN 1994-381).

SMIB 4: stn DW 44, 24°46.00'S, 168°08.02'E (South of Isle des Pins), 300 m, Waren dredge, R. V. *"Alis"*, 8 March 1989: 1 female 50.9 mm (MNHN 1994-384).

Isle of Matthew. VOLSMAR: stn DW 7, 22°26.00'S, 171°44.10'E, 400 m, Waren dredge, 1 June 1989: 1 female 59.5 mm (HUMZ 129487).

DIAGNOSIS. — Small scales on ocular side with moderate ctenii; rostral and orbital knobs absent; gill rakers not serrated; three diffused dark blotches on lateral line; interorbital region narrow.

DESCRIPTION. — Ranges for proportional data are given first, followed by averages. Counts and proportional measurements as percent of SL are shown in Tables 11 and 12. Head length 3.69-4.12, 3.88 in SL; body depth 2.38-2.89, 2.55. Snout length 4.11-4.76, 4.35 in head length; upper eye diameter 2.94-3.81, 3.51; lower eye diameter 3.00-3.81, 3.53; interorbital width 12.47-31.80, 20.24 in females; upper jaw length 2.61-2.82, 2.70 on ocular side, 2.52-2.76, 2.59 on blind side; lower jaw length 1.90-2.01, 1.95 on ocular side, 1.82-1.88, 1.84 on blind side; depth of caudal peduncle 2.53-3.12, 2.81; pectoral fin length 1.64-1.87, 1.74 on ocular side, 2.68-3.79, 3.05

Source : MNHN, Paris

on blind side; pelvic fin length 2.68-3.24, 2.96 on ocular side, 2.93-3.37, 3.12 on blind side; pelvic fin base length 3.39-4.42, 3.79 on ocular side, 5.76-7.95, 6.45 on blind side; length of longest dorsal fin ray 2.00-2.13, 2.08; length of longest anal fin ray 1.92-2.06, 1.99; length of middle caudal fin ray 1.34-1.46, 1.40; curved length of lateral line 1.55-1.97, 1.74.

Body elongated and elliptical, deepest point at about middle of body, its depth 1.30-1.67 times as long as head length. Caudal peduncle deep, its depth 22.4-24.8 % of body depth. Head large, upper profile with a concavity in front of lower margin of upper eye. Snout blunt and long, its length 64.4-89.0 % of upper eye diameter. Rostral or orbital knob absent. Eyes small; upper eye diameter 69.8-91.8 % of upper jaw length on ocular side, lower eye in advance of the upper. Interorbital region shallowly concave, becoming wider proportionally with increasing body size, wider in males than in females. Mouth large, oblique; maxilla extending beyond anterior margin of lower eye; anterior tips of both jaws nearly on same vertical line when mouth closed. A small ventral knob at mandibular symphysis. Teeth on upper jaw sharp, uniserial, becoming larger and more widely spaced anteriorly, some anterior canine-like teeth; lower jaw teeth uniserial, nearly similar to anterior teeth of upper jaw in size and space. Gill rakers on first arch long or moderate in size, not serrate, absent on upper limb. Scales on ocular side small, ctenoid with moderate ctenii, no scales on snout, middle part of interorbital region, anterior parts of both jaws, and basal part of pectoral fins; cycloid scales on blind side. Pectoral fin on ocular side not elongated in both sexes, its length 1.61-2.02 times as long as that on blind side. Pelvic fin on ocular side originating at slightly posterior to tip of isthmus, shorter than head length; third ray on ocular side nearly opposite to first ray on blind side. Tip of isthmus usually below posterior margin of lower eye. Caudal fin rays branched except for two upper- and lowermost rays.

FIG. 18. — *Parabothus coarctatus* (Gilbert, 1905), female, 167.7 mm, from Norfolk Ridge, south of New Caledonia (MNHN 1994-381).

Coloration (in alcohol). Body color on ocular side dark brown; three white bands below upper eye in larger specimens; a pair of obscure dark blotches at junction of straight and curved parts of lateral line, one blotch at middle and posterior portions of straight part of lateral line; dark rings arranged along dorsal and ventral margins of body; many darker spots and rings irregularly scattered on body. Blind side pale yellowish white except for light brown margin of body. Dorsal and anal fins with a series of dark spots; pelvic fin with a dark spot.

Sexual dimorphism. *Parabothus coarctatus* shows sexual dimorphism in only the interorbital width.

DISTRIBUTION. — Hawaiian Islands, Japan and the Coral Sea, at depths of 253-580 m.

REMARKS. — This species has been known from the Hawaiian Islands and southern Japan. This is the first record of this species from the Coral Sea.

Source : MNHN, Paris

TABLE 11. — Frequency distribution of eight meristic characters of *Parabothus coarctatus* (Gilbert, 1905).

Dorsal fin rays						Anal fin rays			
113	114	115	116	117	118	95	96	97	98
1	0	0	0	2	4	1	2	1	3

Pectoral fin rays				Caudal fin rays		Vertebrae		
11	12	13	14	2+13+2	9+35	10+32	10+33	10+34
0(5)	0(2)	6(0)	1(0)	7	1	1	1	4

Scales in lateral line												Gill rakers			
88	89	90	91	92	93	94	95	96	97	98	99	0+8	0+9	0+10	0+11
2	0	0	0	1	1	1	1	0	0	0	1	1	2	3	1

TABLE 12. — Proportional measurements as % of SL in *Parabothus coarctatus* (Gilbert, 1905).

Character	Range (n = 7)	Average	SD
SL (mm)	50.9-180.8	134.7	55.5
HL	24.3-27.1	25.8	1.0
BD	34.6-42.1	39.4	2.6
SNL	5.7-6.1	5.9	0.1
UED	6.6-9.1	7.4	1.0
LED	6.6-8.9	7.4	0.8
IW (F)	0.8-2.1	1.4	0.4
UJL (O)	9.1-10.3	9.6	0.4
UJL (B)	9.5- 10.6	10.0	0.4
LJL (O)	12.5-13.9	13.2	0.4
LJL (B)	13.1-14.5	14.0	0.5
DCP	8.6-9.6	9.2	0.4
P1L (O)	14.0-16.2	15.0	0.8
P1L (B)	7.1-9.3	8.5	0.7
P2L (O)	8.1-9.2	8.7	0.4
P2L (B)	7.9-8.6	8.3	0.3
P2B (O)	6.1-7.3	6.8	0.4
P2B (B)	3.4-4.5	4.0	0.3
LDFR	11.9-12.7	12.2	0.3
LAFR	12.1-13.6	12.7	0.5
MCFR	17.3-20.0	18.5	1.0
LLCW	13.8-16.0	14.9	0.8

Source : MNHN, Paris

ACKNOWLEDGMENTS

We wish to express our sincere thanks to Dr. Bernard SÉRET, ORSTOM/Muséum national d'Histoire naturelle, Paris, for critical reading of our manuscript and for the loan of specimens from ORSTOM collection. Special thanks are due to Prof. Tamotsu IWAI and Dr. Izumi NAKAMURA, Kyoto University, Dr. Jørgen NIELSEN, Copenhagen University, Dr. Han NIJSSEN, University of Amsterdam, Dr. Shih-Chieh SHEN, National Taiwan University, for loans of type specimens, and to Drs. Bertrand RICHER DE FORGES and Michael KULBICKI, ORSTOM Nouméa for collecting specimens. Finally, thanks go to Drs. Kazuhiro NAKAYA and Mamoru YABE, Hokkaido University, for their comments and assistance. This study was supported in part by grants from Scientific Survey (N°07454231) from the Ministry of Education, Science and Culture, Japan and the Ito Foundation for the Advancement of Ichthyology.

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Source : MNHN, Paris

Source : MNHN, Paris

9

Tetraodontiform fishes, mostly from deep waters, of New Caledonia

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ABSTRACT

A study of the tetraodontiforms collected mainly from deep water off New Caledonia by ORSTOM resulted in finding many significant range extensions and numerous specimens of several poorly known species, especially of spikefishes and boxfishes. The New Caledonian collections include 20 species of tetraodontiforms: six of Triacanthodidae, five of Monacanthidae, one of Aracanidae, one of Ostraciidae, one of Triodontidae, and six of Tetraodontidae. Two especially poorly known species of triacanthodids, *Paratriacanthodes retrospinis* and *Triacanthodes intermedius*, are described in detail on the basis of many specimens. The monacanthid *Thamnaconus fijiensis*, hitherto only known from the holotype, is recorded for the first time from outside the type locality. The rarely collected boxfish *Kentrocapros flavofasciatus*, which has been known only from the China seas and Japan, is recorded for the first time from the south Pacific, and this suggests that this species is antitropical in distribution.

RÉSUMÉ

Tétraodontiformes, principalement des eaux profondes, de Nouvelle-Calédonie.

L'étude des Tétraodontiformes récoltés par l'ORSTOM dans les eaux profondes de Nouvelle-Calédonie a permis d'étendre notablement les aires de distribution de nombreuses espèces et de récolter plusieurs spécimens d'espèces peu connues, notamment des poissons-tridents et des poissons-coffres. Cette collection de Nouvelle-Calédonie comprend 20 espèces de

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Source : MNHN, Paris

Tétraodontiformes: six Triacanthodidae, cinq Monacanthidae, une espèce d'Aracanidae, une espèce d'Ostraciidae, une espèce de Triodontidae, et six Tetraodontidae. Deux espèces de Triacanthidae particulièrement peu connues, *Paratriacanthodes retrospinis* et *Triacanthodes intermedius*, sont décrites en détail à partir de nombreux spécimens. Le poisson-bourse *Thamnaconus fijiensis*, connu jusqu'à présent par son holotype, est signalé pour la première fois en dehors de sa localité-type. Le poisson-coffre rarement récolté *Kentrocapros flavofasciatus*, qui n'était connu que des mers de Chine et du Japon, est signalé pour la première fois dans le Pacifique Sud, ce qui suggère une distribution antitropicale pour cette espèce.

INTRODUCTION

The deep-water fish collections made by ORSTOM in the waters around New Caledonia obtained an excellent series of tetraodontiform fishes, with many significant range extensions and numerous specimens of several poorly known species, especially of Triacanthodidae and Aracanidae. The number of species of tetraodontiforms represented is 20; six of Triacanthodidae, five of Monacanthidae, one of Aracanidae, one of Ostraciidae, one of Triodontidae, and six of Tetraodontidae. We take this opportunity to describe in detail the poorly known species and comment on morphological variation, distribution records, and ecological information for other species.

METHODS

Counts and measurements follow the conventions in TYLER (1968) and MATSUURA (1982) for the Triacanthodidae, MATSUURA (1980) for the Monacanthidae, MATSUURA and YAMAKAWA (1982) for the Aracanidae and Ostraciidae, TYLER (1968) for the Triodontidae, and DEKKERS (1975) for the Tetraodontidae. Fin-ray counts include all elements visible externally, even if short (e.g., uppermost pectoral-fin ray) or rudimentary (e.g., posterior dorsal-fin spines and pelvic-fin rays in some triacanthodids and all dorsal-fin spines in triodontids). However, in monacanthids the uppermost rudimentary pectoral-fin ray is excluded from the count. Body length is standard length (SL) unless otherwise specified. Length is recorded to tenths of mm only for sizes under 100 mm. Caudal-fin counts are not mentioned unless they are at variance with the familial norm. Fin-ray counts have the modal value followed in parentheses by any variation in the count among the materials examined, unless a more detailed account of variation is given. A full account of the station data for the various ORSTOM deep-water cruises off New Caledonia between 1978-1989 is given in RICHER DE FORGES (1990), supplemented with the data for ORSTOM's BERYX cruises of 1991-1992 in GRANDPERRIN and LEHODEY (1992) and LEHODEY *et al.* (1993). Specimens are deposited in the collections of Muséum national d'Histoire naturelle, Paris (MNHN), Museum of New Zealand Te Papa Tongarawa (NMNZ) and National Science Museum, Tokyo (NSMT).

SYSTEMATIC ACCOUNT

Family **TRIACANTHODIDAE**

The Triacanthodidae is one of the few families of tetraodontiforms that occur primarily in deep water, usually in waters deeper than 100 m (but with one western Atlantic species occasionally taken as shallow as about 40 m; TYLER, 1968: 85). It is the most speciose of the deep-water groups of tetraodontiforms and is well represented in the ORSTOM collections from New Caledonia. The other primarily deep-water families of tetraodontiforms are the Aracanidae and the monotypic Triodontidae, both also represented in these ORSTOM collections.

Triacanthodids occur in the western Atlantic, Indian and western Pacific oceans, as well as a single species in the central Pacific at Hawaii (*Hollardia goslinei*). In the western Pacific nearly all records of capture are from Japan and China through the Philippines and Indonesia, with discoveries only recently from off the east coast of Australia (MATSUURA & PAXTON, MS). There are only two records of triacanthodids from the south-western

Source : MNHN, Paris

Pacific to the east of Australia: *Triacanthodes ethiops* and *T. intermedius* from New Caledonia (MATSUURA & FOURMANOIR, 1984); and *Macrorhamphosodes uradoi* from New Zealand (MATSUURA, 1987; STEWART & CLARK, 1988). The ORSTOM collections of triacanthodids greatly extend the ranges of several other species into the south-western Pacific, along with new size and depth records. These collections confirm the suggestion by MATSUURA (1987) that the scarce records of triacanthodids in the south Pacific are due to lack of extensive collections there, and that expeditions such as those of ORSTOM in deep water off New Caledonia have a high probability of collecting additional species of triacanthodids.

Genus ***BATHYPHYLAX*** Myers, 1934

Bathyphylax bombifrons Myers, 1934

Fig. 1

Bathyphylax bombifrons Myers, 1934: 10, fig. 1 (Hong Kong).

MATERIAL EXAMINED. — 3 specimens.

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CC 383, 19°40.85'S, 158°46.10'E, 600-615 m depth, otter trawl, R. V. *"Coriolis"*, 21 October 1986: 3 specimens, 86.2-93.0 mm SL (MNHN 1995-529) (photograph of all three specimens in Fig. 1).

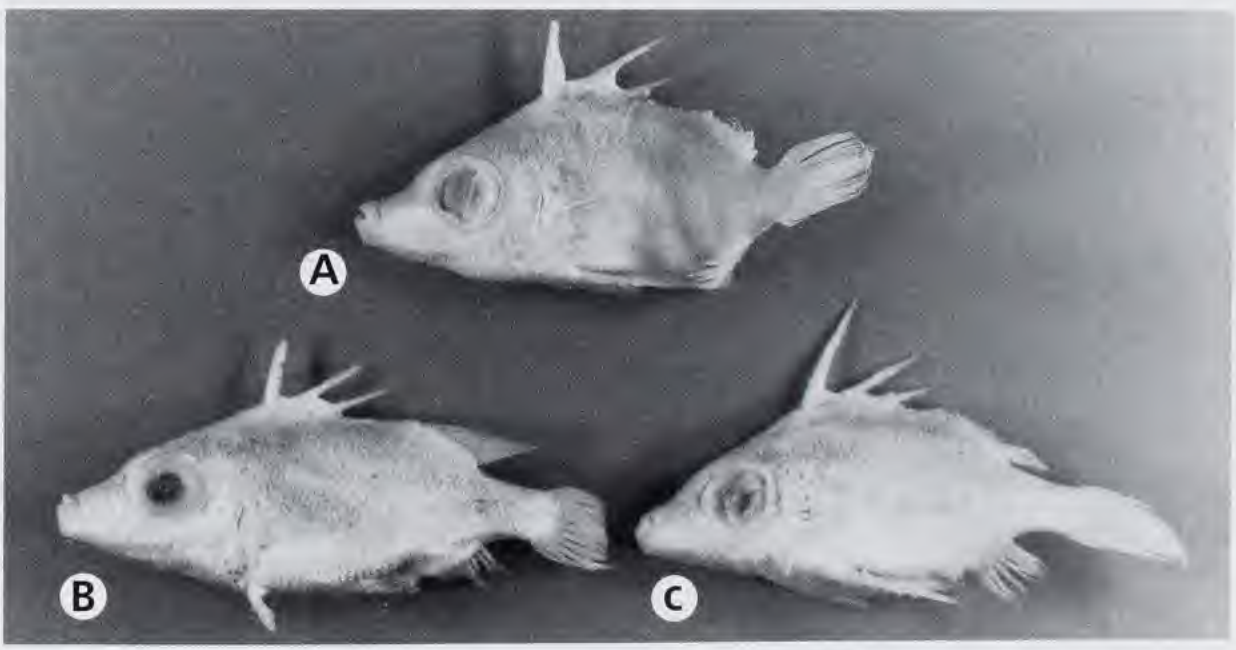

FIG. 1. — *Bathyphylax bombifrons*, MUSORSTOM 5, stn CC 383, all 3 specimens. **A**, **B**, **C**: 92.7 mm, 93.0 mm and 86.2 mm SL (MNHN 1995-529).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal VI (last four short), 13; anal 12 (11); pelvic I, 1 (ray short; ray absent on both sides in specimen of 92.7 mm SL); pectoral 13; teeth in upper jaw 18-21; teeth in lower jaw 24-25; total gill rakers 20-23; lamellae in pseudobranch 12-16 (reaching ventrally to level of top of pectoral-fin base).

Because only five specimens (70.9-84.0 mm SL) of this species have been known previously, we record the following measurements for the three newly collected and slightly larger specimens in order to help clarify the mostly minor differences in morphometrics between *B. bombifrons* and its only congener, *B. omen* (the latter known on the basis on three specimens, 37.5-93.4 mm SL).

Head length 37.1-38.2% SL; snout length 13.8-14.6% SL; snout depth midway between the tips of the teeth and the anterior edge of the orbit (depth of middle of snout) 11.7-11.9% SL; mouth width 6.6-7.1% SL; orbit diameter 14.6-16.1% SL; postorbital length 6.8-8.4% SL; body depth 35.4-38.4% SL; pelvic width 10.7-12.4% SL; pelvic length 33.8-36.0% SL; ratio of pelvic width into pelvic length 2.7-3.3.

When the two species of *Bathyphylax* were first contrasted, the main features of difference between *B. bombifrons* and *B. omen* were thought to be that the former has a narrower pelvis, a shorter postorbital portion of the head, a less distinctly supraterminal mouth, perhaps a few more teeth in each jaw, and a much more concave snout profile (TYLER, 1966, 1968). Some of these differences were thought to be due in part to the size difference between the holotypes of *B. bombifrons* (77.6 mm SL, from South China Sea off Hong Kong) and *B. omen* (37.5 mm SL, from western Indian Ocean off Kenya). When four additional specimens (70.9-84.0 mm SL) of *B. bombifrons* and two additional specimens (67.0-93.5 mm SL) of *B. omen*, all from off Kenya, were compared with the holotypes (TYLER, 1983), it became evident that: the width of the pelvis and length of the postorbital portion of the head both decreased with increasing specimen size and that these proportions were similar in the larger specimens of both species; the mouth was about equally slightly supraterminal in both species; and the teeth were of similar number in both species. The difference in the concavity of the snout became the main distinguishing feature between the two species, along with a possible difference in the color pattern observed in the holotypes. The greater concavity of the snout in *B. bombifrons* was quantified by the measurement of the depth of the snout in the middle of its length, being 10.8-13.4% SL (average 12.0) in *B. bombifrons* and 12.5-15.5% SL (average 13.9) in *B. omen*.

The three specimens of *Bathyphylax* from New Caledonia have the distinctly concave snout typical of *B. bombifrons*, with middle of snout depth measurements of 11.7% SL in one specimen and of 11.9% SL in the other two specimens. Additionally, one of these specimens has enough remains of a color pattern for it to be sure that the lowermost dark stripe on the body, which begins behind the eye and courses over the pectoral-fin base, curves distinctly downward toward the anus and anal-fin origin, as in the holotype of *B. bombifrons* and in contrast to the condition in the holotype of *B. omen*, in which this stripe does not curve distinctly downward but, rather, continues along the body toward the end of the anal-fin base. On the basis of the deeply concave snout profile and coloration, we are confident that the New Caledonian specimens represent *B. bombifrons*.

The three New Caledonian specimens of *B. bombifrons* have 13 dorsal-fin rays while the other five specimens have 14 (as do all specimens of *B. omen*), which difference we attribute to either small sample size or intraspecific variation, perhaps between populations in the Indian Ocean and western Pacific. All of the other meristic features of the New Caledonian specimens are within the norm of both species of *Bathyphylax*.

The scales in the relatively large New Caledonian specimens have six to eight upright spinules per scale plate, a few of which are branched distally, with occasional supplemental spinules irregularly placed to the main vertical row, about the norm for specimens of about this size in both species of *Bathyphylax*.

DISTRIBUTION. — South China Sea, Chesterfield and Bellona Plateaus.

REMARKS. — The 93.0 mm SL specimen is a male and the other two specimens females, the 92.7 mm SL female being especially ripe.

The single station at which *Bathyphylax bombifrons* was collected also yielded *Macrorhamphosodes uradoi*.

Source : MNHN, Paris

Genus *HALIMOCHIRURGUS* Alcock, 1899

Halimochirurgus alcocki Weber, 1913

Figs 2-3

Halimochirurgus alcocki Weber, 1913: 571, pl. 9, fig. 6.

MATERIAL EXAMINED. — 11 specimens.

New Caledonia. CHALCAL 2: stn CH 7, 29°55.50'S, 168°21.10'E, 494-590 m depth, otter trawl, R. V. *"Coriolis"*, 28 October 1986: 2 specimens, 208 mm SL for the specimen in which the tubular snout is intact (MNHN 1994-596) (photographs of this specimen in Figs 2-3); the other specimen has the end of the snout missing, but, on the basis of the size of the body behind the eye, it is slightly larger than the preceding specimen, approximately 215 mm SL (MNHN 1994-597).

MUSORSTOM 4: stn CP 155, 18°52.80'S, 163°19.50'E, 500-570 m depth, beam trawl, R. V. *"Vauban"*, 15 September 1985: 1 specimen, 122 mm SL (MNHN 1994-624). — Stn CP 216, 22°59.50'S, 167°22.00'E, 490-515 m depth, beam trawl, 29 September 1985: 1 specimen, 135 mm SL (MNHN 1994-591).

BERYX 2: stn 5, 24°54.4'S, 168°21.60'E (Seamount "B"), 535-545 m depth, otter trawl, R. V. *"Alis"*, 24 October 1991: 1 specimen, 183 mm SL (NMNZ-P.27448).

BERYX 11: stn C3, 24°56.60'S, 168°21.25'E (seamount "B"), 502-610 m depth, otter trawl, R. V. *"Alis"*, 14 October 1992: 3 specimens, 185-216 mm SL (NMNZ-P.29406). — Stn C29, 23°40.50'S, 167°44.20'E (Stylaster Seamount), 440-480 m depth, otter trawl, 18 October 1992: 1 specimen, 212 mm SL (NMNZ-P.29277). — Stn C 30, 23°36.85'S, 167°42.15'E (Stylaster Seamount), 420-470 m depth, 18 October 1992: 1 specimen, 198 mm SL (NMNZ-P.29173). — Stn CP 51, 23°44.5'S, 168°16.70'E (Jumeaux Seamount), 390-400 m depth, beam trawl, 21 October 1992: 1 specimen, 83.4 mm SL (NMNZ- P.29347).

DESCRIPTION. — Meristics. Dorsal VI (last four spines short), 14 (13); anal 12 (13); pelvic I, 1 (ray short and not visible externally in one specimen); pectoral 13.

There are three to about 14 small conical teeth in the upper and lower jaws of all but two of the 11 specimens, as is typical for this species (TYLER, 1968: 197), with the upper jaw teeth usually slightly smaller than those of the lower jaw. Two of the specimens have exceptional dentition or jaws. One of these, 212 mm SL, has especially well developed and numerous teeth, about 16 in both the upper and lower jaws and with some of them irregularly placed internal to the main series. The other, 208 mm SL, has no teeth evident externally along the relatively firm and smooth gum in either jaw, while the bones in the jaws are immovably bound together in a circular opening (Fig. 3), with the mouth far more rigid than previously known for this species, based on smaller specimens examined. Consolidation (fusion?) of the jaw bones in the small narrow mouth apparently is an occasional condition among larger specimens of this species.

FIG. 3. — *Halimochirurgus alcocki* Weber, 1913, CHALCAL 2, stn CH 7, dorsal view of inflexible mouth of specimen with consolidated bones: 208 mm SL (MNHN 1994-596).

In contrast to the two species of *Macrorhamphosodes*, in which the mouth becomes twisted to one side or the other with increasing specimen size, the mouth remains straight in all previously reported specimens of the two species of *Halimochirurgus*. However, in the 208 mm SL specimen of *H. alcocki* with the unusually inflexible mouth, the mouth is twisted to the left about 20°, an additional unusual feature of this specimen; the frequency of occurrence of this snout twisting and jaw inflexibility among larger specimens of this species remains to be seen.

Source : MNHN, Paris

DISTRIBUTION. — Japan to East Africa.

REMARKS. — The largest specimen of this species previously recorded with precision is 165 mm SL by TYLER (1968), with MATSUURA (1984) giving 170 mm SL as the maximum standard length, although TOMIYAMA and ABE (1958) state that it reaches about 200 mm total length. The two specimens of 212 mm SL (233-238 mm total length) and that of 216 mm SL (245 mm total length) are larger than any previously reported specimens of *H. alcocki*, variously as 165 mm SL (TYLER, 1968), 170 mm SL (MATSUURA, 1984), or about 200 mm TL (TOMIYAMA & ABE, 1958).

One specimen, 212 mm SL, is a ripening female, and four others, 185-216 mm SL, appear to be males with well-developed testes. Nothing was apparent in the alimentary canal.

Halimochirurgus alcocki was collected sympatrically with other triacanthodids at the following ORSTOM stations: with *Macrorhamphosodes uradoi* at CHALCAL 2, stn CH 7 and at BERYX 11, stn C 30; with *Paratriacanthodes retrospinis* at MUSORSTOM 4, stn CP 216; and with both *M. uradoi* and *P. retrospinis* at BERYX 2, stn 5 and BERYX 11, stn C 29.

FIG. 2. — *Halimochirurgus alcocki* Weber, 1913, CHALCAL 2, stn CH 7, 1 of 2 specimens: 208 mm SL (MNHN 1994-596).

Genus ***MACRORHAMPHOSODES*** Fowler, 1934

Macrorhamphosodes uradoi (Kamohara, 1933)

Figs 4-5

Halimochirurgus uradoi Kamohara, 1933: 392, figs 1-3 (Japan).

MATERIAL EXAMINED. — 20 specimens.

New Caledonia. BIOCAL: stn CP 67, 24°55.44'S, 168°21.55'E, 500-510 m depth, beam trawl, R. V. *"Jean Charcot"*, 3 September 1985: 1 specimen, 46.2 mm SL (MNHN 1994-635) (photograph in Fig. 4).

MUSORSTOM 4: stn CC 201, 18°55.80'S, 163°13.80'E, 500 m depth, otter trawl, R. V. *"Vauban"*, 20 September 1985: 1 specimen, 110 mm SL (MNHN 1994-634). — Stn CC 202, 18°58.00'S, 163°10.50'E, 580 m depth, otter trawl, 20 September 1985: 1 specimen, 85.5 mm SL (NSMT-P.46810, ex-MNHN 1994-633).

CHALCAL 2: stn CH 7, 29°55.50'S, 168°21.10'E, 494-590 m depth, otter trawl, R. V. *"Coriolis"*, 28 October 1986: 2 specimens, 178-211 mm SL (MNHN 1994-598 & 599) (photograph of both specimens in Fig. 5). — Stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m depth, otter trawl, 28 October 1986: 2 specimens, 148-157 mm SL (MNHN 1994-594 & 595). — Stn CC 2, 24°55.48'S, 168°21.29'E, 500-610 m depth, otter trawl, 28 October 1986: 1 specimen, 80.0 mm SL (MNHN 1994-621).

BERYX 2: stn 5, 24°54.40'S, 168°21.60'E (Seamount "B"), 535-545 m depth, otter trawl, R. V. *"Alis"*, 24 October 1991: 4 specimens, 111-185 mm SL (NMNZ-P.27447). — Stn 16, 23°35.60'S, 169°36.52'E (Seamount « D »), 660-675 m depth, otter trawl, 29 October 1991: 3 specimens, 131-156 mm SL (NMNZ-P.27497).

BERYX 11: stn C28, 23°36.85'S, 167°41.85'E (Stylaster Seamount), 430-490 m depth, otter trawl, R. V. *"Alis"*, 18 October 1992: 1 specimen, 160 mm SL (NMNZ-P.29252). — Stn C29, 23°40.50'S, 167°44.20'E (Stylaster Seamount), 440-480 m

Source : MNHN, Paris

depth, otter trawl, 18 October 1992: 1 specimen, 108 mm SL (NMNZ-P.29278). — Stn C30, 23°36.85'S, 167°42.15'E (Stylaster Seamount), 420-470 m depth, otter trawl, 18 October 1992: 2 specimens, 114-123 mm SL (NMNZ-P.29174).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CC 383, 19°40.85'S, 158°46.10'E, 600-615 m depth, otter trawl, R. V. *"Coriolis"*, 21 September 1986: 1 specimen, 128 mm SL (MNHN 1994-631).

DESCRIPTION. — Meristics. Dorsal VI (last three spines short), 14 (13-15); anal 13 (12-14); pelvic I, 1 (ray short); pectoral 13 (14).

Among the four species of triacanthodids with long tubular snouts, *Macrorhamphosodes uradoi* is distinctive in having the wide mouth (about twice as wide as the snout immediately behind it, versus about the same width in *Halimochirurgus*) bearing relatively few flattened spatula-like teeth that are distally rounded in adults (versus more numerous and distally truncate teeth in *M. platycheilus*).

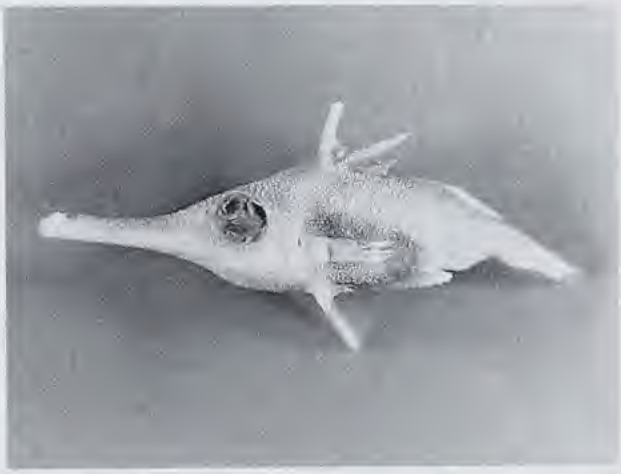

FIG. 4. — *Macrorhamphosodes uradoi* (Kamohara, 1933), BIOCAL, stn CP 67: 46.2 mm SL (MNHN 1994-635).

The 20 specimens from New Caledonia have the same pattern of slightly increasing number and distal rounding of the teeth with increasing specimen size as illustrated by TYLER (1968: 210) for this species: the two smallest specimens, 46 and 80 mm SL, have three or four teeth in the upper jaw and ten in the lower jaw, with those in the lower jaw tapering to points distally; the specimens of 86 and 111 mm SL have two teeth in the upper jaw and 12-13 in the lower jaw that are more rounded than pointed distally; all of the larger specimens, 114 to 211 mm SL have two teeth in the upper jaw and 13-15 (usually 14-15) in the lower jaw that are rounded distally, except that one of these specimens has only 12 teeth in a damaged and healed lower jaw. The mouth is only slightly twisted (to the right) in the 46 mm SL specimen but distinctly twisted to one side or the other with increasing specimen size in all of the larger specimens, eight to the right and eleven to the left, up to about 70° in the 178 mm SL specimen but to only about 45° in the two largest specimens, 185 and 211 mm SL.

DISTRIBUTION. — This species is frequently recorded from Japan and extends to east Africa (TYLER, 1983, 1986) but has previously been reported in the south-west Pacific only from New Zealand (MATSUURA, 1987; STEWART & CLARK, 1988), at slightly greater depths than elsewhere; respectively 519 m and 480-528 m. The New Caledonian specimens were collected at depths of 420-675 m.

REMARKS. — Two (178 and 211 mm SL) of the largest three specimens are ripe females, while many of the other larger specimens appear to be males with well-developed testes. No scales are present in the gut of any of the specimens in this species which is known to feed on the scales of other fishes (TYLER, 1968).

The largest specimen of this species previously recorded with precision is 195 mm SL by AMAOKA (1982), who states that the species reaches about 200 mm SL. The 211 mm SL (243 mm total length) specimen from New Caledonia represents a slight increase in the maximum known size. The smallest specimen previously recorded is 41 mm SL by MATSUURA (1985), and the smallest New Caledonian specimen, at 46 mm SL, is a valuable addition to our knowledge of the juveniles of the species.

Macrorhamphosodes uradoi has not previously been taken in the company of other triacanthodids (TYLER, 1968, 1983) but off New Caledonia it was collected sympatrically with other triacanthodids at the following ORSTOM stations: with *Halimochirurgus alcocki* at CHALCAL 2, stn CH 7 and BERYX 11, stn C 30; with *Paratriacanthodes retrospinis* at CHALCAL 2, stn CC 1 and stn CC 2, BIOCAL, stn CP 67, MUSORSTOM 4, stn CC 202, and BERYX 2, stn 16; with both *H. alcocki* and *P. retrospinis* at BERYX 2, stn 5 and BERYX 11, stn C 29; with *Triacanthodes intermedius* at MUSORSTOM 4, stn CC 201; and with *Bathyphylax bombifrons* at MUSORSTOM 5, stn CC 383.

Source : MNHN, Paris

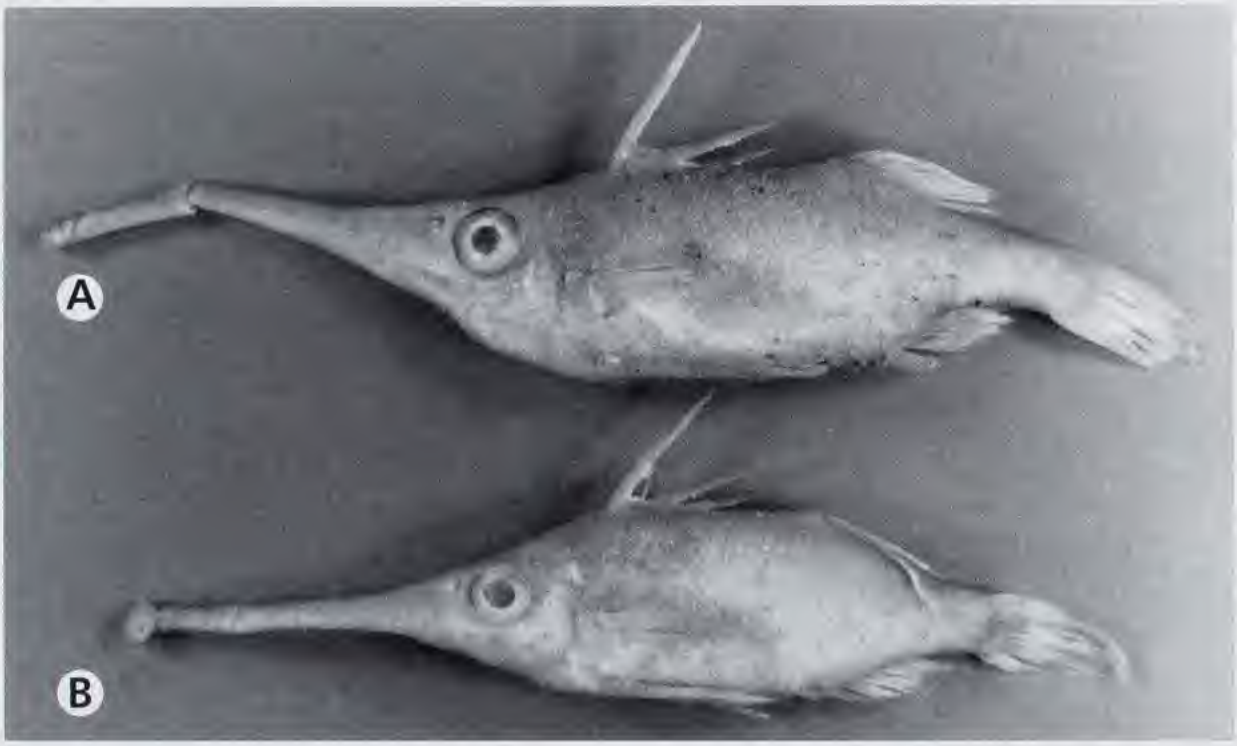

FIG. 5. — *Macrorhamphosodes uradoi* (Kamohara, 1933), CHALCAL 2, stn CH 7. **A**, **B**: 211 mm and 178 mm SL (MNHN 1994-598 & 599).

Genus ***PARATRIACANTHODES*** Fowler, 1934

Paratriacanthodes retrospinis Fowler, 1934

Figs 6-9

Paratriacanthodes retrospinis Fowler, 1934: 364, fig. 114 (Formosa).

MATERIAL EXAMINED. — 61 specimens.

New Caledonia. BIOCAL: stn CP 67, 24°55.44'S, 168°21.55'E, 500-510 m depth, beam trawl, R. V. *"Jean Charcot"*, 3 September 1985: 5 specimens, 27.5-53.3 mm SL (MNHN 1994-641 to 645). — Stn CP 109, 22°10.03'S, 167°15.22'E, 495-515 m depth, beam trawl, 9 September 1985: 1 specimen, 37.7 mm SL (MNHN 1994-640).

MUSORSTOM 4: stn CP 180, 18°56.80'S, 163°17.70'E, 450 m, beam trawl, R. V. *"Vauban"*, 18 September 1985: 2 specimens, 21.9-33.5 mm SL (MNHN 1994-638 & 639). — Stn CP 194, 18°52.80'S, 163°21.70'E, 550 m depth, beam trawl, 19 September 1985: 2 specimens, 60.5-64.0 mm SL (MNHN 1994-600 & 601). — Stn CP 198, 18°49.40'S, 163°18.80'E, 590 m depth, beam trawl, 20 September 1985: 1 specimen, 74.5 mm SL (MNHN 1994-632). — Stn CP 200, 18°53.80'S, 163°14.10'E, 545 m depth, beam trawl, 20 September 1985: 1 specimen, 92.5 mm SL (MNHN 1994-637). — Stn CP 202, 18°58.00'S, 163°10.50'E, 580 m depth, beam trawl, 20 September 1985: 8 specimens, 60.0-80.0 mm SL (MNHN 1994-612 to 619). — Stn CP 216, 22°59.50'S, 167°22.00'E, 490-515 m depth, beam trawl, 29 September 1985: 3 specimens, 61.2-86.3 mm SL (MNHN 1994-581 to 583) (photographs of both sides of all three specimens in Figs. 8-9).

CHALCAL 2: stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m, R. V. *"Coriolis"*, otter trawl, 28 October 1986: 5 specimens, 34.2-91.0 mm SL (MNHN 1994-607 to 611). — Stn CC 2, 24°55.48'S, 168°21.29'E, 500-610 m depth, otter trawl, 28 October 1986: 9 specimens, 29.4-87.9 mm SL (MNHN 1994-584 & 585; MNHN 1994-625 to 630; MNHN 1994-636) (photograph of 69.6 and 83.3 mm SL specimens in Fig. 6). — Stn CP 25, 23°38.60'S, 167°43.12'E, 418 m depth, beam trawl, 30 October 1986: 5 specimens, 33.5-90.3 mm SL (MNHN 1994-586 to 590) (photograph of all five specimens in Fig. 7).

Source : MNHN, Paris

BERYX 2: stn 5, 24°54.40'S, 168°21.60'E (Seamount "B"), 535-545 m depth, otter trawl, R. V. *"Alis"*, 24 October 1991: 2 specimens, 86.6-91.6 mm SL (NMNZ-P.27452). — Stn 16, 23°35.60'S, 169°36.52'E (Seamount "D"), 660-675 m depth, otter trawl, 29 October 1991: 3 specimens, 52.1-88.8 mm SL (NMNZ-P.27496).

BERYX 11: stn C3, 24°56.60'S, 168°21.25'E (Seamount "B"), 502-610 m depth, otter trawl, R. V. *"Alis"*, 14 October 1992: 5 specimens, 67.5-98.8 mm SL (NMNZ-P.29407). — Stn C4, 24°52.70'S, 168°21.80'E (Seamount "B"), 550-920 m depth, otter trawl, 14 October 1992: 3 specimens, 73.3-86.5 mm SL (NMNZ-P.29226). — Stn C6, 24°53.80'S, 168°21.50'E (Seamount "B"), 505-620 m depth, otter trawl, 15 October 1992: 1 specimen, 70.9 mm SL (NMNZ-P.29366). — Stn CP7, 24°54.75'S, 168°21.30'E (Seamount "B"), 510-550 m depth, beam trawl, 15 October 1992: 2 specimens, 28.3-33.2 mm SL (NMNZ-P.29206). — Stn CP 8, 24°53.65'S, 168°21.50'E (Seamount "B"), 540-570 m depth, beam trawl, 15 October 1992: 1 specimen, 74.0 mm SL (NMNZ-P.29058). — Stn C29, 23°40.50'S, 167°44.20'E (Stylaster Seamount), 440-480 m depth, otter trawl, 18 October 1992: 2 specimens, 91.5-92.7 mm SL (NMNZ-P.29276).

Chersterfield and Bellona Plateaus. MUSORSTOM 5: stn CC 366, 19°45.40'S, 158°45.62'E, 650 m depth, otter trawl, R. V. *"Coriolis"*, 19 October 1986: 4 specimens, 88.0-110 mm SL (MNHN 1994-623 & 623; NSMT-P.46002).

DESCRIPTION. — The two most comprehensive descriptions of this species have both been based on a relatively small number of specimens: seven specimens of 25.9-89.2 mm SL from Japan, China, and east Africa in TYLER's (1968) systematic monograph of the family; and five specimens of 92-119 mm SL from Japan and Taiwan by AMAOKA (1982). The ORSTOM collections from New Caledonia contain 65 specimens of 21.9 - 110 mm SL and we take this opportunity to record more substantial morphometric and meristic data for this species than previously possible.

Meristics (except for pelvic-fin rays, counts were recorded for only a majority of the 65 specimens). Dorsal VI (spines decreasing gradually in length to the short last element), 15 rays in 50 specimens, 14 in 5 specimens, 16 in 3 specimens; anal 13 in 53 specimens, 12 in 2 specimens, 14 in 3 specimens; pelvic I, 1 (ray short) in all 65 specimens; pectoral 14 in 102 fins, 13 in 6 fins, 15 in 6 fins; teeth in upper jaw 10-18, 14.6 average in 38 specimens; teeth in lower jaw 15-24, 19.0 average in 38 specimens; no inner series teeth in any of these 38 specimens; total gill rakers 17-23, 20.4 average in 30 specimens; lamellae in pseudobranch 12-16, average 13.5 in 29 specimens (reaching ventrally from one-fourth to two-thirds down pectoral-fin base).

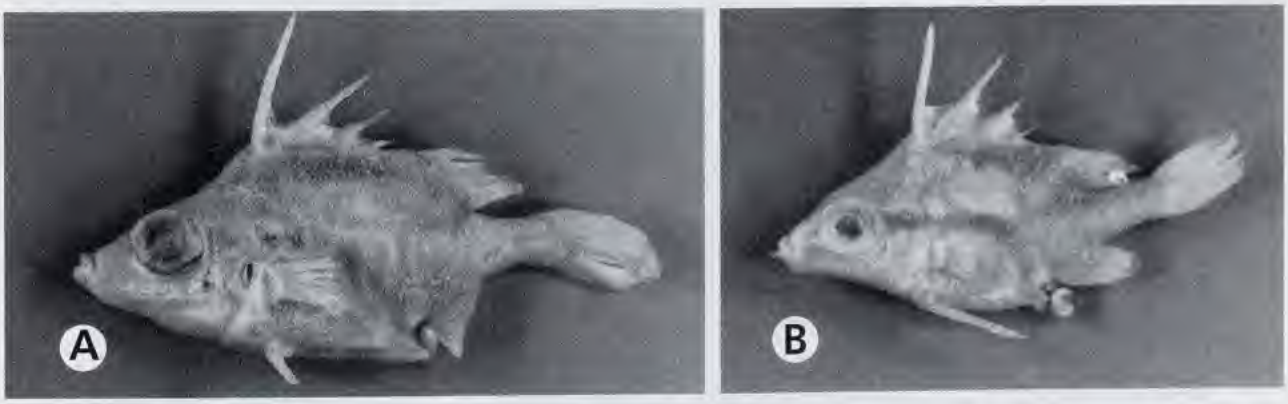

FIG. 6. — *Paratriacanthodes retrospinis* Fowler, 1934, CHALCAL 2, stn CC 2, 2 of 9 specimens. **A**, **B**: 83.3 mm and 69.6 mm SL (MNHN 1994-584 & 585).

Because there are substantial allometric changes with increasing specimen size in certain body proportions, especially in those of the divisions of the head, in body depth, and in pelvic width relative to pelvic length, we

Source : MNHN, Paris

have divided the specimens into two size groups at a gap in their size distribution and give the measurements for the smaller specimens, of 21.9-40.4 mm SL, separately from those of the larger specimens, of 51.1-110 mm SL, in both cases with the range of the measurement in percent of standard length followed in parentheses by the average value. The data for the smaller specimens are based on nine to 14 specimens and that for the larger specimens on 28 specimens in all cases.

Head length 35.9-44.7% SL (39.7) in smaller and 32.8-39.4% SL (36.3) in larger specimens. Snout length 10.3-13.9% SL (12.3) in smaller and 10.5-13.6% SL (12.1) in larger specimens. Orbit diameter 16.4-19.6% SL (17.7) in smaller and 14.1-18.8% SL (16.2) in larger specimens. Postorbital length (here and elsewhere, least distance from rear of orbit to upper end of gill opening) 8.5-10.5% SL (9.2) in smaller and 8.0-9.9% SL (9.1) in larger specimens. Gill opening length 3.8-5.0% SL (4.4) in smaller and 3.7-6.7% SL (5.1) in larger specimens. Body depth 38.5-52.1% SL (46.3) in smaller and 36.9-43.9% SL (40.3) in larger specimens. Pelvic width (here and elsewhere, between bases of pelvic-fin spines at locking flanges) 10.4-17.4% SL (13.6) in smaller and 8.2-12.1% SL (10.5) in larger specimens. Pelvic length (here and elsewhere, between level of middle of bases of pelvic-fin spines and distal tip of pelvis just in front of anus) 32.5-42.5% SL (36.5) in smaller and 29.6-36.6% SL (33.2) in larger specimens. Ratio of pelvic width into pelvic length 2.3-3.0 (2.7) in smaller and 2.7-4.1 (3.2) in larger specimens.

The specimens of less than 30 mm SL have one or two upright spinules per scale plate, while those of 30 to 50 mm SL have two or three spinules, those of 50 to 80 mm SL three to seven spinules in a major row plus one or two accessory spinules, and those of 80 to 110 mm SL seven to ten spinules in a major row plus two to five accessory spinules. While the spinules in the larger specimens sometimes arise from a single base or have closely adjacent bases, the distal ends of the spinules remain unbranched.

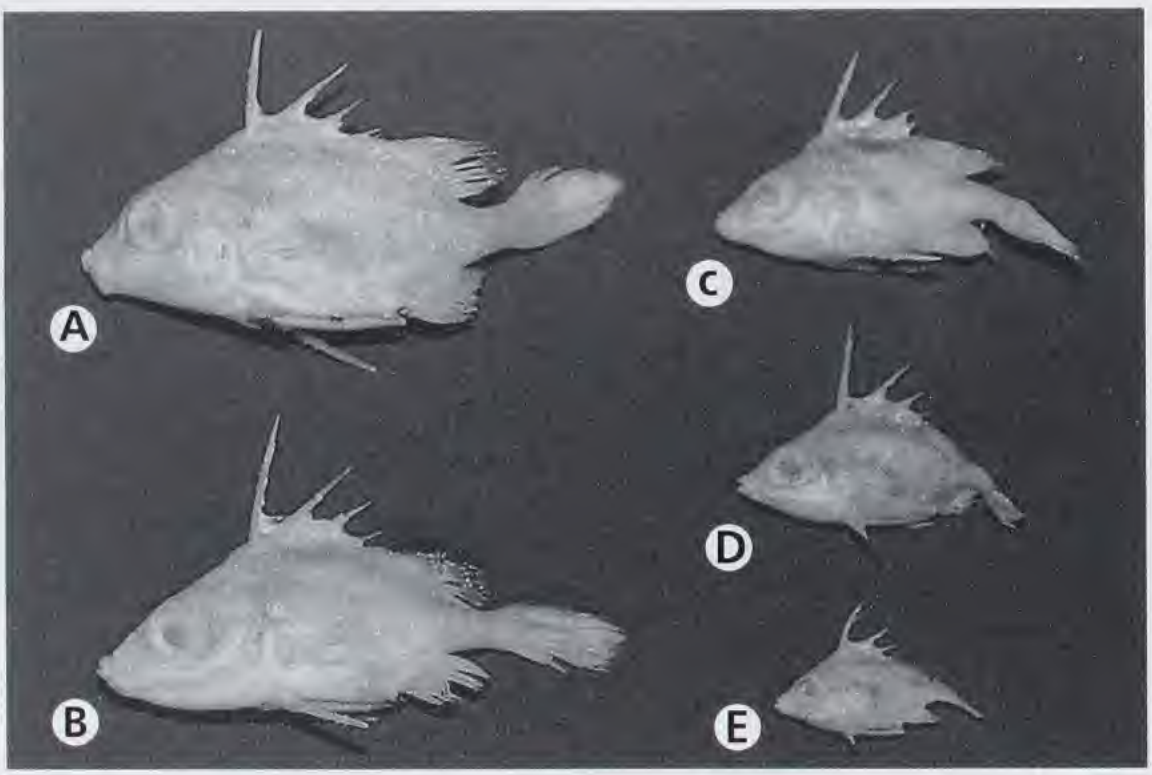

FIG. 7. — *Paratriacanthodes retrospinis* Fowler, 1934, CHALCAL 2, stn CP 25, all 5 specimens. **A**, **B**, **C**, **D**, **E**: : 90.3 mm, 79.5 mm, 57.5 mm, 51.1 mm and 33,5 mm SL (MNHN 1994-586 to 590).

Source : MNHN, Paris

The average values for all of these meristics and morphometrics of the New Caledonian materials are closely similar to those given for *P. retrospinis* in TYLER (1968) and confirm the diagnostic differences between it and its congener, *P. herrei*. Predictably, with the larger number of specimens available from New Caledonia, the ranges of the values in *P. retrospinis* are somewhat extended in many cases.

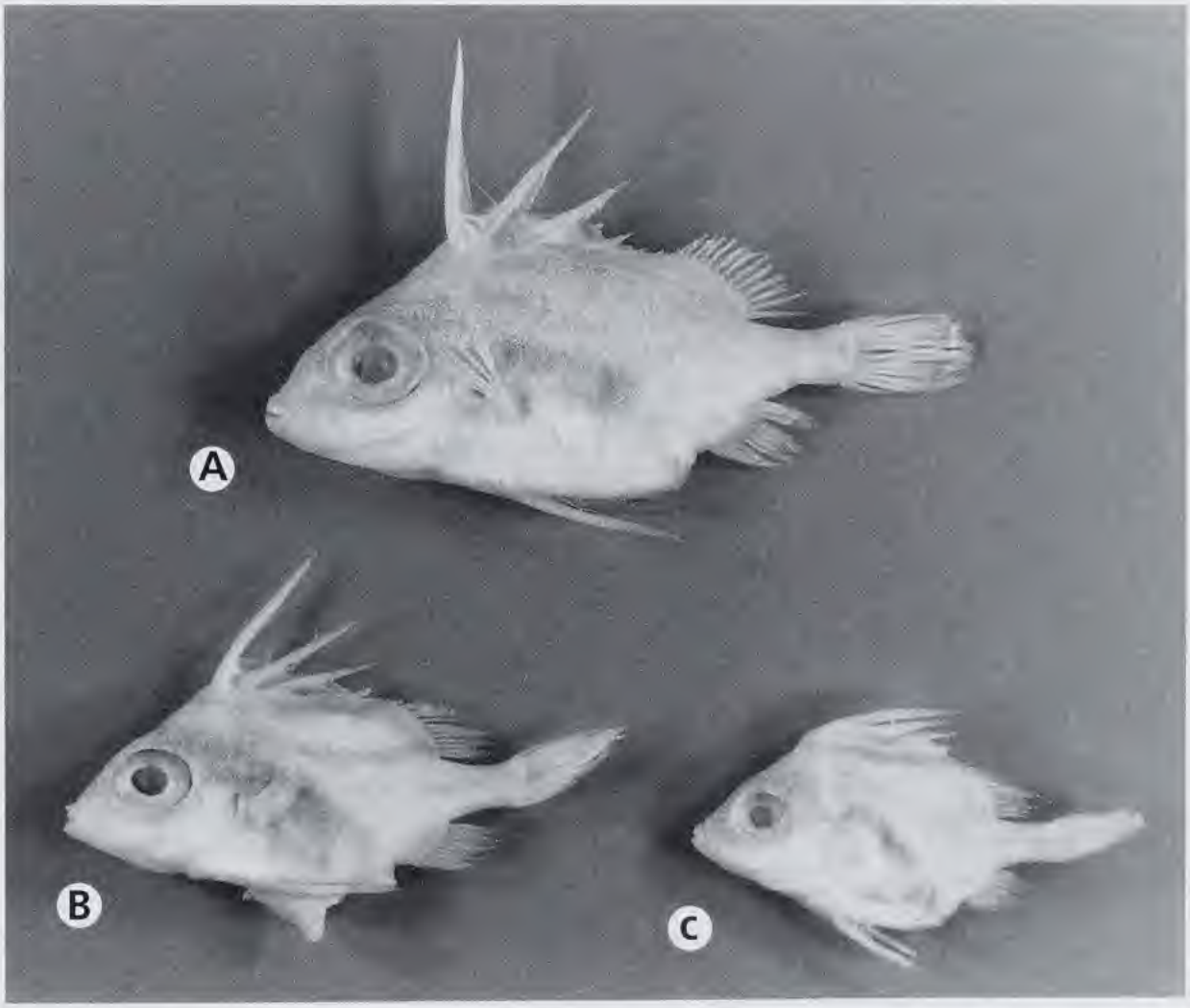

FIG. 8. — *Paratriacanthodes retrospinis* Fowler, 1934, MUSORSTOM 4, stn CP 216, left side view of all 3 specimens. **A**, **B**, **C**: 86.3 mm, 72.3 mm, and 61.2 mm SL (MNHN 1994-581 to 583); note the irregular occurrence of the pale circle color pattern variant from one side to the other of the same specimen (see Fig. 9).

The color pattern is relatively well preserved in many of these specimens, far more so than in the specimens described in TYLER (1968), including the holotype illustrated therein (fig. 51). That illustration of the holotype, collected in 1908, emphasizes the three pale lines (now known to be blue in life) between the three major dark stripes (reddish) present horizontally along the upper two-thirds of the body. This same emphasis on the pale lines is given in the color illustrations of fresh specimens of this species in TOMIYAMA and ABE (1958) and KAMOHARA (1961), with the upper two pale lines shown terminating in the region below the soft dorsal-fin base but the lowermost pale line as continuing posteriorly to the middle of the caudal-fin base, and all of the lines shown with relatively straight margins. However, the photographs of fresh specimens in AMAOKA (1982) and MATSUURA (1984) indicate that the pale lines are less straight and precisely outlined than shown in the above referenced illustrations. It is now obvious that in fresh specimens it is the three pale blue lines that strike the eye and that in

Source : MNHN, Paris

preserved materials it is the dark stripes (reddish in life but brownish-black in preservation) that dominate the color pattern. Of the dark stripes in preserved specimens, it is the upper stripe along the base of the dorsal fins and the lower stripe from the eye over the pectoral-fin base to the rear of the abdomen that are more prominent than the less well-defined band in between them (Figs. 6-7 show this pattern in specimens of both small and large size).

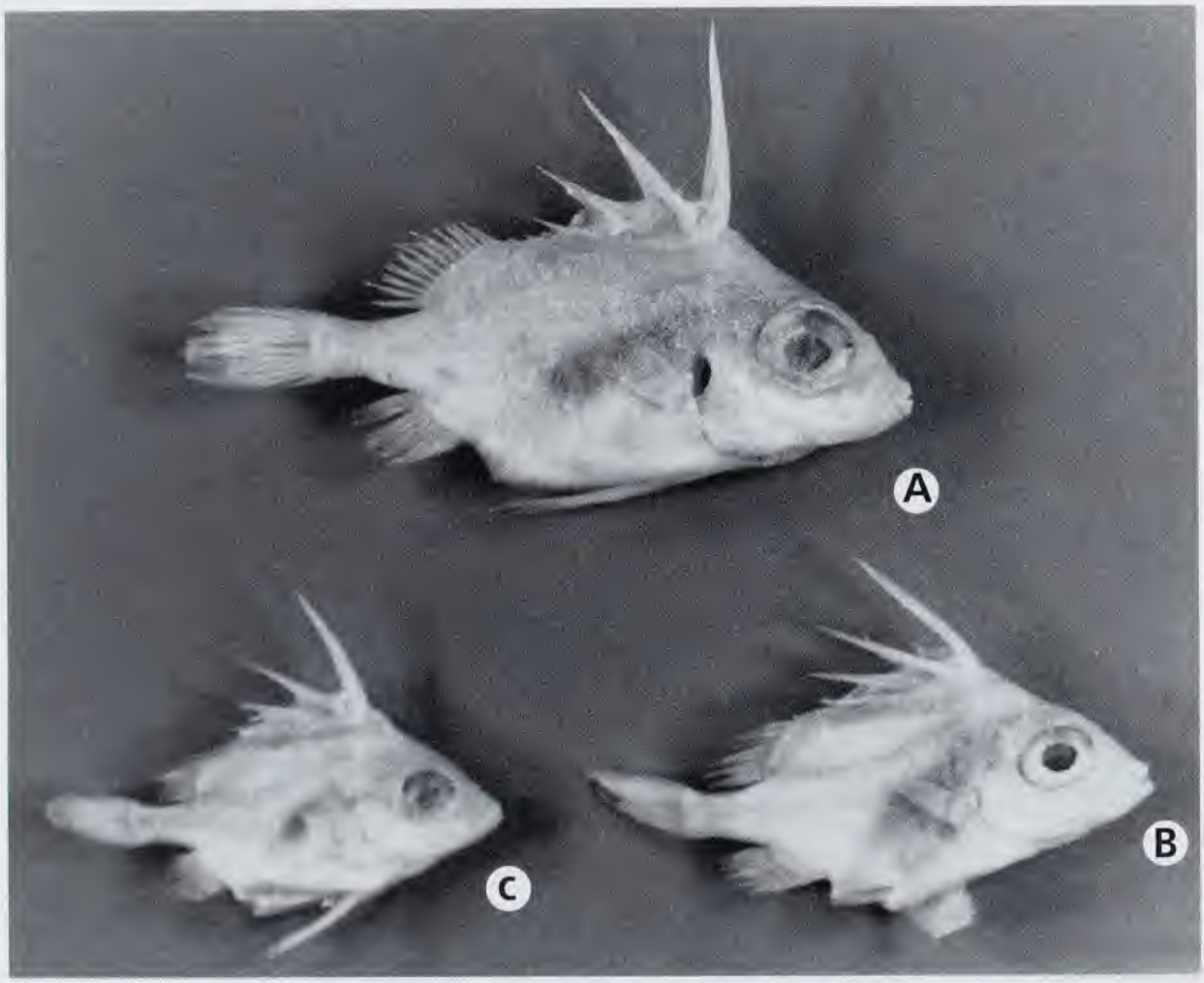

FIG. 9. — *Paratriacanthodes retrospinis* Fowler, 1934, MUSORSTOM 4, stn CP 216, right side view of the specimens shown in Fig. 8 (MNHN 1994-581 to 583).

Based on both fresh and preserved materials, the sequence of the stripes and lines from dorsal to ventral is as follows: the general red background color of the head and body forming a dark stripe, with a wavy lower edge, from below the front of the spiny dorsal-fin base to below the anterior one-third of the soft-dorsal fin base; an upper narrow wavy pale blue line from about the level of the middle of the distance between the eye and the spiny dorsal-fin origin to about the middle of the soft dorsal-fin base, where it is slightly expanded and upturned; a relatively diffuse red stripe from the level of just above the eye to the posterior half of the soft dorsal-fin base, where it is slightly expanded and most deeply pigmented; a middle narrow wavy pale blue line from just above the middle of the eye to about the middle of the body at the level of the middle of the soft dorsal-fin base, where it may be continuous with the lower pale line; an especially distinct red stripe from the middle of the rear of the eye to just above the pectoral-fin base and along the region just above the top of the abdominal cavity, turning slightly downward at the level of the anus; a lower narrow wavy pale blue line from the lower rear of the eye to the top of the pectoral-fin base and along the region just below the top of the abdominal cavity where at the level of the anus

Source : MNHN, Paris

it either anastomoses with or closely approaches the posterior region of the middle pale line and then turns slightly upward to continue on posteriorly to the middle of the caudal-fin base; the general red background color of the body present as a band below the lower pale line in the upper half of the abdominal region but the lower half of the abdomen being silvery blue; in the region of the posterior half of the body and caudal peduncle there are irregular pale blue anastomoses, especially in the region of the lower pale line.

Exceptional in color pattern among the ORSTOM materials are the three specimens of *P. retrospinis* from MUSORSTOM 4, stn CP 216. Each of these has an indication of a prominent pale circle on the body, but this is only distinctly present on one side of the body and not on both sides in all three specimens and it is of irregular placement (Figs. 8-9 show both sides of these specimens). The pale circle is most prominent and most symmetrical on the abdomen of the right side of the 61.2 mm SL specimen; its prominence is due in part to the dark peritoneum being seen through the abdominal wall at the center of the circle. The pale circles are higher and/or more posterior on the body in the other two specimens and the centers are not especially dark in appearance. In all other respects except the presence of the pale circles, these three specimens have typical features of *P. retrospinis*, including morphometric and meristic values that are the norm for this species. Two of these three specimens are mature males and the other, the smallest, is probably a developing male, but many mature and developing males (and females) are present among the far more numerous specimens of *P. retrospinis* without pale circles from New Caledonia and the color pattern differences do not seem to be correlated with sex. Because these pale circles are so irregular in occurrence, as is their placement, in these three specimens, and further because they are not present on other specimens from New Caledonia and elsewhere, we are confident the circles are a color pattern variant based on the pattern of anastomosing pale lines observed on the lower posterior half of the body in many specimens, as described above. Therefore, we consider these three specimens to be *P. retrospinis*.

This explanation probably applies as well to the specimen of *Triacanthodes intermedius* collected from off New Caledonia (one of the two specimens from MUSORSTOM 4, stn CP 171), which alone among the numerous specimens of that species also has a similar pale circle on one side but not on the other.

We presume that the pale circles (presumedly blue in life) are an infrequent and irregular aspect of the normal color pattern of a small minority of specimens of *Paratriacanthodes retrospinis* and, even less frequently, of *Triacanthodes intermedius*.

The pattern of dark stripes in *Paratriacanthodes retrospinis* described above is basically similar to that in *P. herrei*, and the color pattern distinction between these two species of the genus described by TYLER (1968), in over-emphasizing the pale lines of *P. retrospinis*, probably does not exist, because the dark stripes are essentially the same in both species.

DISTRIBUTION. — Japan, China, Mozambique, Natal, New Caledonia, Chesterfield and Bellona Plateaus.

REMARKS. — The specimens of *P. retrospinis* collected at 660-675 m off New Caledonia represent a new depth record for this species, previously known as deep as 550 m (AMAOKA, 1982). This species obtains a slightly larger size than the largest specimen (110 mm SL) from New Caledonia, up to 120 mm SL (TOMIYAMA & ABE, 1958; AMAOKA, 1982; MATSUURA, 1984), while the smallest specimen (21.9 mm SL) from New Caledonia is slightly smaller than previously reported (25.9 mm SL, TYLER, 1968), with the 12 specimens in the 21.9 - 40.4 mm SL size range representing by far the largest number of young juveniles yet available for study.

Paratriacanthodes retrospinis has not previously been taken in the company of other triacanthodids (TYLER, 1968, 1983), but off New Caledonia it was collected together (and therefore approximately sympatrically) with other triacanthodids at the following ORSTOM stations: with *Triacanthodes intermedius* at MUSORSTOM 4, stn CP 180; with *Macrorhamphosodes uradoi* at BIOCAL, stn CP 67, MUSORSTOM 4, stn CC 202, CHALCAL 2, stn CC 1 and stn CC 2, and BERYX 2, stn 16; with *Halimochirurgus alcocki* at MUSORSTOM 4, stn CP 216; and with both *M. uradoi* and *H. alcocki* at BERYX 2, stn 5 and BERYX 11, stn C 29.

Of the 24 specimens in which sex could be determined with confidence by gross examination of the gonads under a dissecting microscope, at sizes of greater than about 60 mm SL, 8 are females (64.0-110 mm SL) with ripening ovaries and 16 are males (60.5-110 mm SL) with developing to well-developed testes, and this

Source : MNHN, Paris

unbalanced sex ratio seems to apply to the numerous other specimens of this species in which sex determination was less certainly suggested.

Genus *TRIACANTHODES* Bleeker, 1858

Triacanthodes ethiops Alcock, 1894

Fig. 10

Triacanthodes ethiops Alcock, 1894: 137, pl. 7 (Bay of Bengal).

MATERIAL EXAMINED. — 28 specimens.

Chesterfield and Bellona Plateaus. CHALCAL 1: stn CH 2, 22°34.41'S, 159°17.39'E, 330 m depth, otter trawl, R. V. *"Coriolis"*, 28 July 1984: 15 specimens, 70.4-86.7 mm SL (MNHN 1995-556).

MUSORSTOM 5: stn CH 271, 24°48.24'S, 159°34.60'E, 250-276 m depth, otter trawl, R. V. *"Coriolis"*, 9 October 1986: 1 specimen, 70.5 mm SL (MNHN 1995-555). — Stn CP 318, 22°26.51'S, 159°21.36'E, 330 m depth, beam trawl, 13 October 1986: 2 specimens, 72.7-73.3 mm SL (MNHN 1995-552) (photograph of both specimens in Fig. 10).

New Caledonia. MUSORSTOM 4: stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m depth, otter trawl, R. V. *"Vauban"*, 3 October 1985: 9 specimens, 47.1- 65.6 mm SL (MNHN 1995-554). — Stn CC 246, 22°08.50'S, 167°11.50'E, 410-420 m depth, otter trawl, 3 October 1985: 1 specimen, 48.6 mm SL (MNHN 1995-553).

DESCRIPTION. — Meristics. Dorsal VI, 15 (14); anal 13 (12-14); pelvic I, 2; pectoral 14 (13).

Triacanthodes ethiops is one of the most commonly collected triacanthodid fishes and has been described in detail by TYLER (1968). The New Caledonian materials contain a specimen of 86.7 mm SL, slightly larger than the largest previously reported (81.9 mm SL by TYLER, 1968).

The meristics of the New Caledonian specimens mostly overlap those previously reported, although the ranges of dorsal and anal-fin ray counts are extended respectively to 14 (the previous lowest count was 15) and 14 (the previous highest count was 13).

DISTRIBUTION. — *Triacanthodes ethiops* is known in the Pacific from Japan, the Philippines, Indonesia and New Caledonia (TYLER, 1968; MATSUURA & FOURMANOIR, 1984), and in the Indian Ocean along the east coast of Africa (TYLER, 1968); it has recently been discovered off the east coast of Australia (MATSUURA & PAXTON, unpublished).

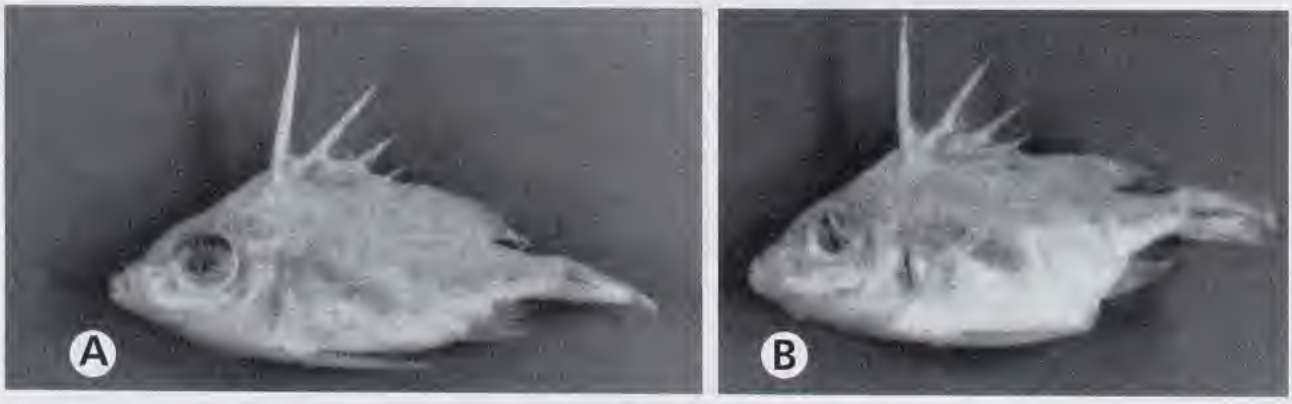

FIG. 10. — *Triacanthodes ethiops* Alcock, 1894, MUSORSTOM 5, stn CP 318, both specimens. **A, B**: 73.3 mm and 72.7 mm SL (MNHN 1995-552).

Source : MNHN, Paris

Triacanthodes intermedius Matsuura & Fourmanoir, 1984

Fig. 11

Triacanthodes intermedius Matsuura & Fourmanoir, 1984: 32, fig., holotype 71.7 mm LS (NSMT-P.22373), Isle des Pins (New Caledonia), 1 April 1978, 360-415 m.

MATERIAL EXAMINED. — 16 specimens.

New Caledonia. BIOCAL: stn CP 42, 22°45.14'S, 167°12.12'E, 380 m depth, beam trawl, R. V. *"Jean Charcot"*, 30 August 1985: 3 specimens, 41.7-68.0 mm SL (MNHN 1995-546) (photograph of all three specimens in Fig. 11).

MUSORSTOM 4: stn CP 171, 18°57.80'S, 163°14.00'E, 435 m depth, beam trawl, R. V. *"Vauban"*, 17 September 1985: 2 specimens, 52.1-61.3 mm SL (MNHN 1995-549). — Stn CP 180, 18°56.80'S, 163°17.70'E, 450 m depth, beam trawl, 18 September 1985: 1 specimen, 59.7 mm SL (MNHN 1995-544). — Stn CP 201, 18°55.80'S, 163°13.80'E, 500 m depth, beam trawl, 20 September 1985: 2 specimens, 59.5-71.5 mm SL (MNHN 1995-545). — Stn CP 214, 22°53.80'S, 167°13.90'E, 425-440 m depth, beam trawl, 28 September 1985: 2 specimens, 49.0-59.4 mm SL (MNHN 1995-547). — Stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m depth, otter trawl, 3 October 1985: 3 specimens, 48.9-63.1 mm SL (NSMT-P.46809). — Stn CC 246, 22°08.50'S, 167°11.50'E, 410-420 m depth, otter trawl, 3 October 1985: 1 specimen, 60.6 mm SL (MNHN 1995-548). — Stn CC 247, 22°09.00'S, 167°13.30'E, 435-460 m depth, otter trawl, 4 October 1985. 2 specimens, 54.0-65.9 mm SL (MNHN 1995-543).

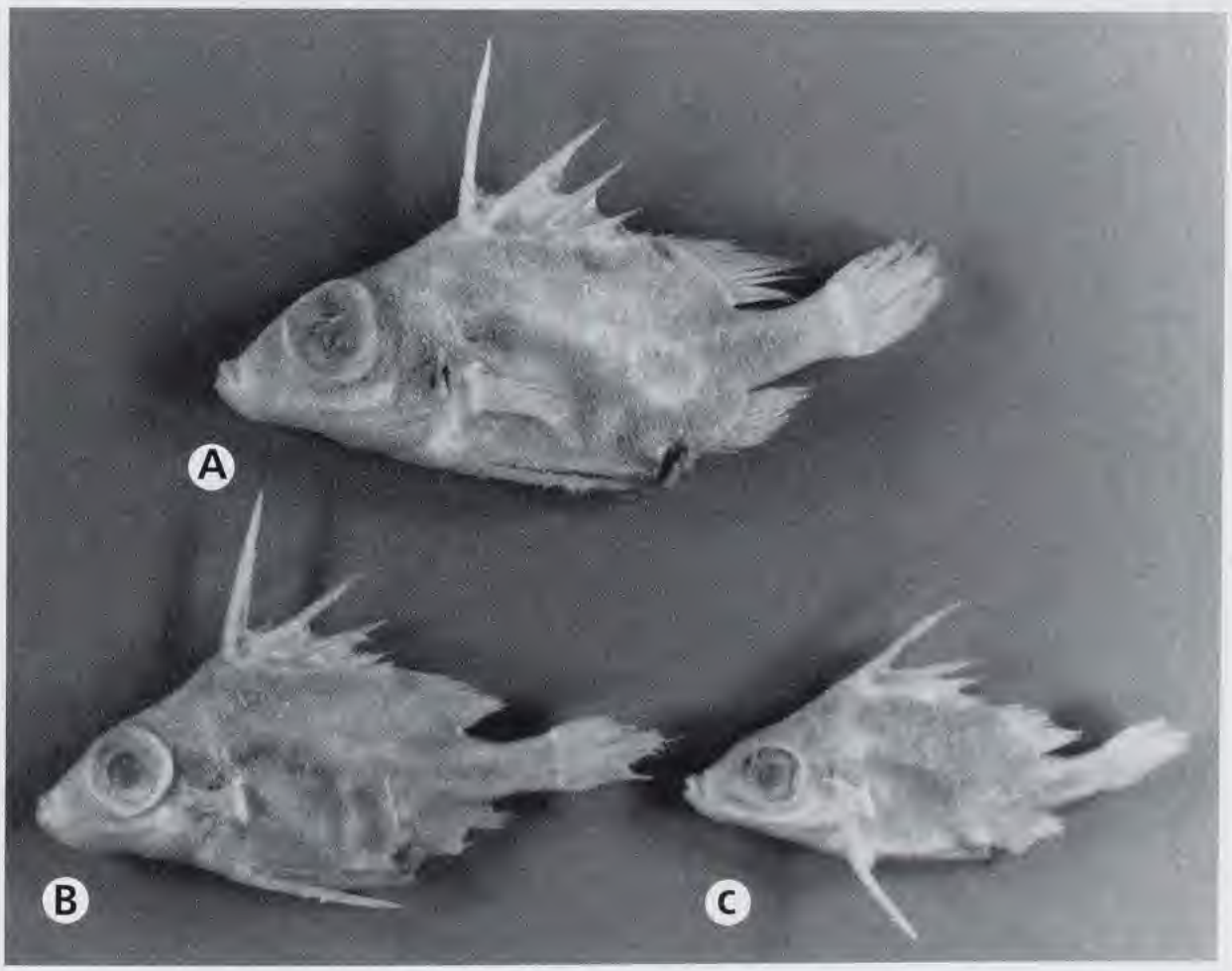

FIG. 11. — *Triacanthodes intermedius* Matsuura & Fourmanoir, 1984, BIOCAL, stn CP 42, all 3 specimens. A, B, C: 68.0 mm, 41.7 mm and 52.1 mm SL (MNHN 1995-546).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal VI, 15 rays in 14 specimens, 14 in 1 specimen, 16 in 1 specimen; anal 13 in 15 specimens, 12 in 1 specimen; pelvic I, 2 rays in 20 fins, 1 ray in 12 fins; pectoral 14 in 24 fins, 13 in 3 fins, 15 in 5 fins; outer teeth in upper jaw 12-17, 14.8 average, 2 inner teeth in 8 specimens, 1 in 6 specimens, none in 2 specimens; outer lower jaw teeth 14-21, 17.9 average, 2 inner teeth in 13 specimens, 1 in 2 specimens, none in 1 specimen; total gill rakers 15-22, 18.8 average; lamellae in pseudobranch 17-24, 18.4 average (reaching ventrally from halfway down to level of lower edge of pectoral-fin base); olfactory lamellae 12-15, 13.2 average.

Proportional measurements of all specimens are followed in parentheses by the average value. Head length 42.2-51.8% SL (39.4), snout length 12.1-14.9% SL (13.7), orbit diameter 16.8-20.1% SL (18.2), postorbital length 8.2-11.8% SL (10.0), interorbital width 10.2-13.7% SL (11.5), gill opening length 4.8-6.9% SL (6.1), snout to spiny dorsal fin 41.0-46.8% SL (44.5), body depth 42.2-51.8% SL (45.0), first dorsal spine length 28.9-41.0% SL (36.0), length of soft dorsal-fin base 15.3-19.2% SL (17.3), soft dorsal-fin height 10.1-16.3% SL (13.4), length of anal-fin base 10.9-14.1% SL (12.8), anal-fin height 10.3-13.9% SL (11.8), caudal-fin length 23.5-28.6% SL (25.4), caudal peduncle depth 8.4-11.1 % SL (9.5), caudal peduncle length 15.4-19.7 % SL (17.7), pelvic width 4.4-5.9% SL (5.1), pelvic length 26.6-32.6% SL (29.6), olfactory organ diameter 3.2-5.3% SL (4.5), distance between olfactory organs 3.8-5.9% SL (4.8).

Triacanthodes intermedius is a rarely collected and poorly known species, until now represented only by the two type specimens collected from New Caledonia (MATSUURA & FOURMANOIR, 1984). The ORSTOM collections off New Caledonia obtained 16 specimens of this species, permitting us to better characterize it.

MATSUURA & FOURMANOIR (1984) stated that *T. intermedius* shows the intermediate conditions of many of the distinguishing characters between *Triacanthodes* and *Paratriacanthodes*. The counts and morphometrics of the large numbers of New Caledonian materials of *T. intermedius* confirm this statement, and many of the ranges of the character values in *T. intermedius* are extended.

The gill opening of *T. intermedius* is moderate in length, extending ventrally about halfway down the pectoral-fin base. The lamellae of the pseudobranch reach ventrally from halfway down to the level of the lower edge of the pectoral-fin base. In these two features *T. intermedius* is more similar to *Paratriacanthodes* than to the other members of *Triacanthodes*.

There are usually inner teeth in both the upper and lower jaws of *T. intermedius*, though two specimens have no inner teeth in the upper jaw and one specimen has no inner teeth in the lower jaw. A similar situation has been reported by TYLER (1968) in *T. ethiops*; 10% of the specimens examined by him have no inner teeth in the upper jaw.

The shape of the pelvis of *T. intermedius* differs from that of the other species of *Triacanthodes* but resembles that of *Paratriacanthodes herrei* (MATSUURA & FOURMANOIR, 1984). The narrower pelvis (4.4-5.9 % SL) of *T. intermedius* clearly separates it from the congeners having a wider pelvis (7.0-10.7% SL).

The color pattern is much better preserved in several specimens of the New Caledonian materials than in the two type specimens described by MATSUURA & FOURMANOIR (1984). The yellowish-tan body of preserved specimens is marked by three principal dark lines, as well as by a short longitudinal dark line on the caudal peduncle. The uppermost line runs from the base of the first dorsal spine to the origin of the soft dorsal fin. The middle line runs from above the anterior part of the eye to the end of the soft dorsal-fin base. The lowermost line starts from the mid-posterior edge of the eye and runs postero-ventrally to the anus. This color pattern is the same as that observed in *T. anomalus*, and differs from that in *T. ethiops*.

One of the two specimens of *T. intermedius* from MUSORSTOM 4, stn CP 171 has a pale circle on one side of the body. Similar pale circles are found in three specimens of *Paratriacanthodes retrospinis* from MUSORSTOM 4, stn CP 216, and we consider these circles to be variations of the anastomosing pale lines observed on the lower posterior half of the body in many specimens of *P. retrospinis* and *T. intermedius* (see comments under *P. retrospinis*).

DISTRIBUTION. — New Caledonia.

REMARKS. — *Triacanthodes intermedius* was collected together with *P. retrospinis* at MUSORSTOM 4, stn CP 180 and with *T. ethiops* at MUSORSTOM 4, stn CC 245 and stn CC 246.

Source : MNHN, Paris

Family **MONACANTHIDAE**

Although many species of filefishes are found in shallow waters, usually shallower than 50 m, some groups of filefishes, particularly the large-sized species (e.g., those of *Thamnaconus*), inhabit continental slopes as deep as 450 m (see account of *Thamnaconus tessellatus*, below), whereas the small-sized species, such as *Paramonacanthus japonicus* and *Pseudalutarius nasicornis*, are found in depths less than 60 m.

Genus ***PARAMONACANTHUS*** Bleeker, 1865

Paramonacanthus japonicus (Tilesius, 1801)

Fig. 12

Monacanthus japonicus Tilesius, 1801: 212, pl. 13 (Japan).

MATERIAL EXAMINED. — 8 specimens.

New Caledonia. MUSORSTOM 4: stn CC 146, 19°53.40'S, 163°47.10'E, 34 m depth, otter trawl, R. V. *"Vauban"*, 13 September 1985: 5 specimens, 70.1-84.5 mm SL (MNHN 1995-539) (photograph of 70.1, 72.8, 73.0 and 84.5 mm SL specimens in Fig. 12). — Stn CC 147, 19°35.00'S, 163°39.60'E, 46 m depth, otter trawl, 13 September 1985: 3 specimens, 80.7-90.5 mm SL (MNHN 1995-538).

DESCRIPTION. — Meristics. Dorsal II, 28 (27-29); anal 28 (27-29); pectoral 11 (12).

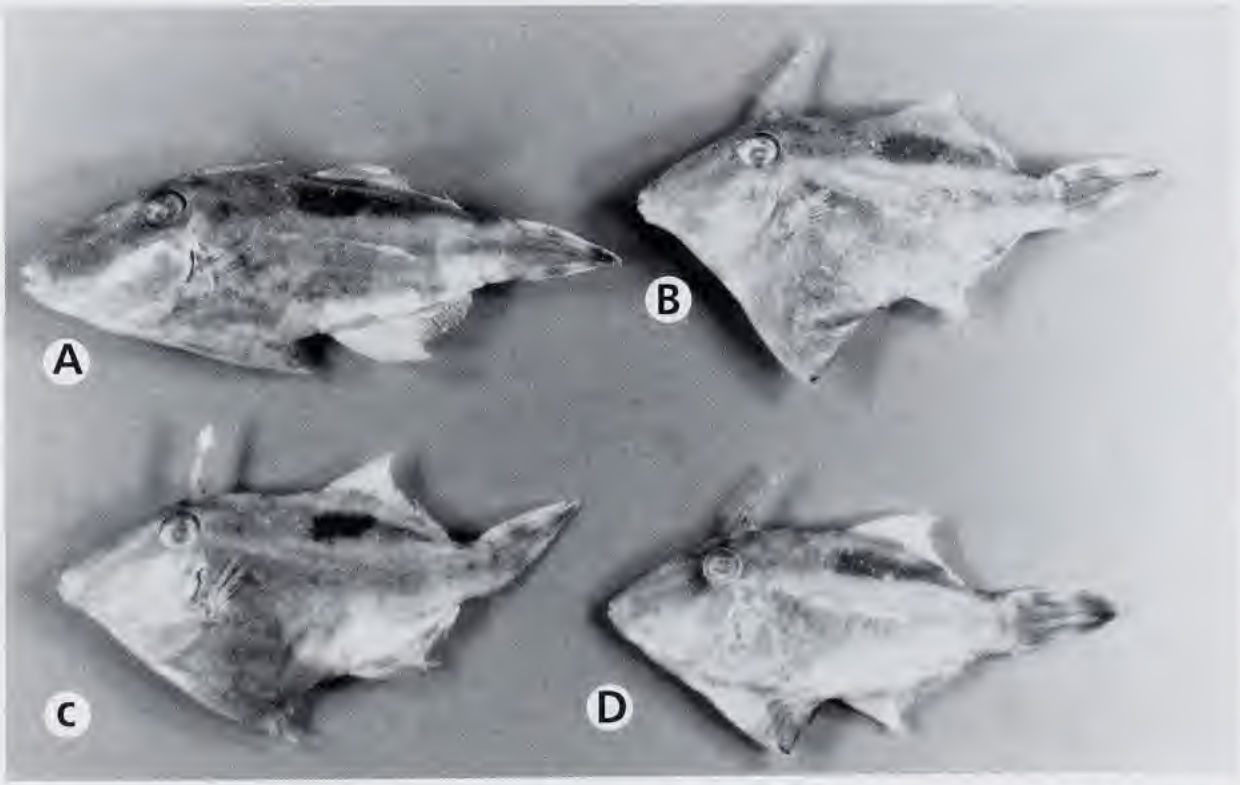

FIG. 12. — *Paramonacanthus japonicus* (Tilesius, 1801), MUSORSTOM 4, stn CC 146, 4 of 5 specimens. **A**, **B**, **C**, **D**: 84.5 mm (male), 73.0 mm (female), 72.8 mm (female) and 70.1 mm (female) SL (MNHN 1995-539).

Source : MNHN, Paris

REMARKS. — *Paramonacanthus japonicus* is widely distributed in shallow waters in the Indo-west Pacific, usually in sandy-muddy otters. This species, like others of the genus, shows sexual dimorphism in the shape of the body and caudal fin, and in color. The male has a shallower body (31.0-32.6% SL) and filamentous caudal fin rays, whereas the female has a deeper body (41.6-41.8% SL) and no produced rays in the caudal fin. *Paramonacanthus curtorhynchus* (Bleeker) is a junior synonym of *P. japonicus* (B. HUTCHINS, pers. comm.).

Genus ***PSEUDALUTARIUS*** Bleeker, 1865

Pseudalutarius nasicornis (Temminck & Schlegel, 1850)

Fig. 13

Alutera nasicornis Temminck & Schlegel, 1850: 293, pl. 131, fig. 2 (Japan).

MATERIAL EXAMINED. — 3 specimens.

New Caledonia. MUSORSTOM 4: stn CP 148, 19°23.40'S, 163°31.90'E, 59 m depth, beam trawl, R. V. *"Vauban"*, 14 September 1985: 3 specimens, 104-119 mm SL (MNHN 1995-527) (photograph of 104 and 119 mm SL specimens in Fig. 13).

FIG. 13. —*Pseudalutarius nasicornis* (Temminck & Schlegel, 1850), MUSORSTOM 4, stn CP148, 2 of 3 specimens. **A**, **B**: 119 mm and 104 mm SL (MNHN 1995-527).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal II, 47 (49); anal 43-46; pectoral 11.

Pseudalutarius nasicornis is a derived monacanthid, distinguished from all others in having the dorsal spine anterior to the eye.

DISTRIBUTION. — This species is distributed in shallow waters in the subtropical and tropical regions in the Indo-west Pacific from South Africa eastward through Indonesia to the east coast of Australia (HUTCHINS, 1986; KUITER, 1993), and northward to southern Japan (MATSUURA, 1988).

Genus ***THAMNACONUS*** Smith, 1949

Thamnaconus fijiensis Hutchins & Matsuura, 1984

Fig. 14

Thamnaconus fijiensis Hutchins & Matsuura, 1984: 387, figs 1-2-3 (Fiji).

MATERIAL EXAMINED. — 1 specimens.

New Caledonia. BIOCAL: stn CP 84, 20°42.94'S, 167°01.50'E, 150-210 m depth, beam trawl, R. V. *"Jean Charcot"*, 6 September 1985: 1 specimen, 102 mm SL (MNHN 1995-528).

FIG. 14. — *Thamnaconus fijiensis* Hutchins & Matsuura, 1984, BIOCAL, stn CP 84, 1 specimen: 102 mm SL (MNHN 1995-528).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal II, 34; anal 33; pectoral 13.

The proportional measurements of the New Caledonian specimen are: head length 34.2% SL, snout length 26.6% SL, eye diameter 12.0% SL, interorbital width 11.7% SL, gill opening length 10.0% SL, snout to spiny dorsal fin 35.9% SL, snout to anal fin 69.1% SL, body depth 41.6% SL, body width 13.9% SL, first dorsal-spine length 27.1% SL, length of longest dorsal-fin ray (5th) 12.6% SL, length of longest anal-fin ray (5th) 12.5% SL, length of soft dorsal-fin base 34.2% SL, length of anal-fin base 31.2% SL, pectoral-fin length 13.2% SL, caudal-fin length 30.6% SL, caudal peduncle depth 10.1% SL, caudal peduncle length 9.8% SL.

Thamnaconus fijiensis was described on the basis of a single specimen collected in a fish trap outside Suva Barrier Reef, Fiji, at the depth of 183 m (HUTCHINS & MATSUURA, 1984). The New Caledonian specimen, though smaller than the 137 mm SL holotype, does not differ from it in general appearance. However, the fin-ray counts of the New Caledonian specimen are slightly different from those of the holotype (shown in parentheses); dorsal rays 34 (33) and anal rays 33 (32).

DISTRIBUTION. — Fiji, New Caledonia.

REMARKS. — Judging from the collection depths of the holotype and the New Caledonian specimen, *T. fijiensis* is a relatively deep-dwelling species. The closest relative of this species is *T. fajordoi*, known from the east coast of Africa (HUTCHINS & MATSUURA, 1984).

Thamnaconus modestoides (Barnard, 1927)

Fig. 15

Cantherines modestoides Barnard, 1927: 958 (Algoa Bay).

MATERIAL EXAMINED. — 2 specimens.

Loyalty Islands. MUSORSTOM 6: stn CP 400, 20°42.18'S, 167°00.40'E, 270 m depth, beam trawl, R. V. *"Alis"*, 14 February 1989: 1 specimen, 145 mm SL (MNHN 1995-531).

FIG. 15. — *Thamnaconus modestoides* (Barnard, 1927), MUSORSTOM 6, stn CP 400, 1 specimen: 145 mm SL (MNHN 1995-531).

Source : MNHN, Paris

New Caledonia. BERYX 11: stn C41, 23°39.20'S, 168°00.50'E, 230-360 m depth, R. V. *"Alis"*, otter trawl, 20 October 1992: 1 specimen, 246 mm SL (NMNZ-P.29304).

DESCRIPTION. — Meristics. Dorsal II, 35; anal 32-33; pectoral 13.

The New Caledonian materials have slightly lower dorsal-fin ray counts than previously reported from South Africa (36-38 by HUTCHINS, 1986), but their dorsal fin-ray counts fall within the ranges reported from Japan (33-34 by ZAMA & YASUDA, 1979; 34-35 by MATSUURA, 1985).

DISTRIBUTION. — *Thamnaconus modestoides* has been reported from the east coast of Africa, northwestern Australia, and Japan (ZAMA & YASUDA, 1979; ALLEN & SWAINSTON, 1988; MATSUURA, 1988).

Thamnaconus tessellatus (Günther, 1880)

Figs 16-17

Monacanthus tessellatus Günther, 1880: 54, pl. 23, fig. B (Philippines).

MATERIAL EXAMINED. — 13 specimens.

New Caledonia. CHALCAL 2: stn CP 26, 23°18.15'S, 168°03.58'E, 296 m depth, beam trawl, R. V. *"Coriolis"*, 31 October 1986: 4 specimens, 53.0-130 mm SL (MNHN 1995-550) (photograph of 54.0 and 61.0 mm SL specimens in Fig. 16).

BERYX 11: stn C 13, 24°43.16'S, 168°08.92'E, 230-240 m depth, otter trawl, R. V. *"Alis"*, 16 October 1992: 1 specimen, 292 mm SL (NMNZ-P.29180). — Stn CP 16, 24°47.12'S, 168°08.71'E, 240-250 m depth, beam trawl, 16 October 1992: 1 specimen, 43.3 mm SL (NMNZ-P.29092). — Stn CP 17, 24°48.00'S, 168°08.80'E, 250-270 m depth, beam trawl, 16 October 1992: 1 specimen, 184 mm SL (NMNZ-P.29384). — Stn CP 23, 24°43.40'S, 168°07.75'E, 270-290 m depth, beam trawl, 17 October 1992: 1 specimen, 181 mm SL (NMNZ-P.29191). — Stn CP 25, 24°43.52'S, 168°08.52'E, 230-235 m depth, beam trawl, 17 October 1992: 1 specimen, 172 mm SL (NMNZ-P.29316). — Stn CP 28, 23°36.85'S, 167°41.85'E, 430-490 m depth, beam trawl, 18 October 1992: 1 specimen, 199 mm SL (NMNZ-P.29256). — Stn CP 45, 23°40.27'S, 168°00.95'E, 270-290 m depth, beam trawl, 20 October 1992: 1 specimen, 172 mm SL (NMNZ-P.29316).

Chesterfield and Bellona Plateaus. MUSORSTOM 5: stn CP 268, 24°44.70'S, 159°39.20'E, 280 m depth, beam trawl, R. V. *"Coriolis"*, 9 October 1986: 1 specimen, 130 mm SL (MNHN 1995-530). — Stn CP 318, 22°26.51'S, 159°21.36'E, 330 m depth, beam trawl, 13 October 1986: 1 specimen, 189 mm SL (MNHN 1995-531) (photograph of this specimen in Fig. 17).

DESCRIPTION. — Meristics. Dorsal II, 36 (35-38); anal 33 (32-35); pectoral 13 (14).

Thamnaconus tessellatus has been confused with *T. hypargyreus* (Cope) (e.g., MASUDA *et al.*, 1975). They are similar in having many spots on the body; however, the number of spots are greater in *T. tessellatus* than in *T. hypargyreus*. Although the color of the spots in preserved specimens is dark brown in both of these species, the color of the spots in fresh specimens is dark brown in *T. tessellatus* and dark yellow or yellowish-brown in *T. hypargyreus*. *Thamnaconus tessellatus* also differs from *T. hypargyreus* in the color pattern of the head; *T. tessellatus* has dark brown spots on the snout whereas *T. hypargyreus* has no spots on the snout but has longitudinal blue (pale in preserved specimens) lines on the snout.

Juveniles of two species are distinguished by the color pattern; *Thamnaconus tessellatus* has the overall dark pigmentation in the caudal fin and the obvious rows of dark spots extending posteriorly from the middle of the eye (the contraction in the size of the spots is a variation occasionally found in both species) (B. HUTCHINS, pers. comm.).

DISTRIBUTION. — The fishes of the genus *Thamnaconus* are poorly known because of their generally deep-water habitats; the previous deepest record for the genus is 360 m (HUTCHINS & MATSUURA, 1984). One of the specimens of *T. tessellatus* from New Caledonia (NMNZ-P.29256) was collected at 430-490 m; other specimens from New Caledonia were collected at depths of 230-296 m. *Thamnaconus tessellatus* has been recorded from southern Japan southward through the Philippines and Indonesia to eastern Australia (SAINSBURY *et al.*, 1985; B. HUTCHINS, pers. comm.).

Source : MNHN, Paris

The population of *Thamnaconus hypargyreus* in the East China Sea was erroneously described as a new species *Thamnaconus xanthoptera* by XU & ZHAN (1988). However, judging from their original description, it is a junior synonym of *T. hypargyreus*.

Thousands of specimens of *Thamnaconus tessellatus* have been observed washed up on the beaches in the Ogasawara Islands in winter (MATSUURA & TACHIKAWA, 1994).

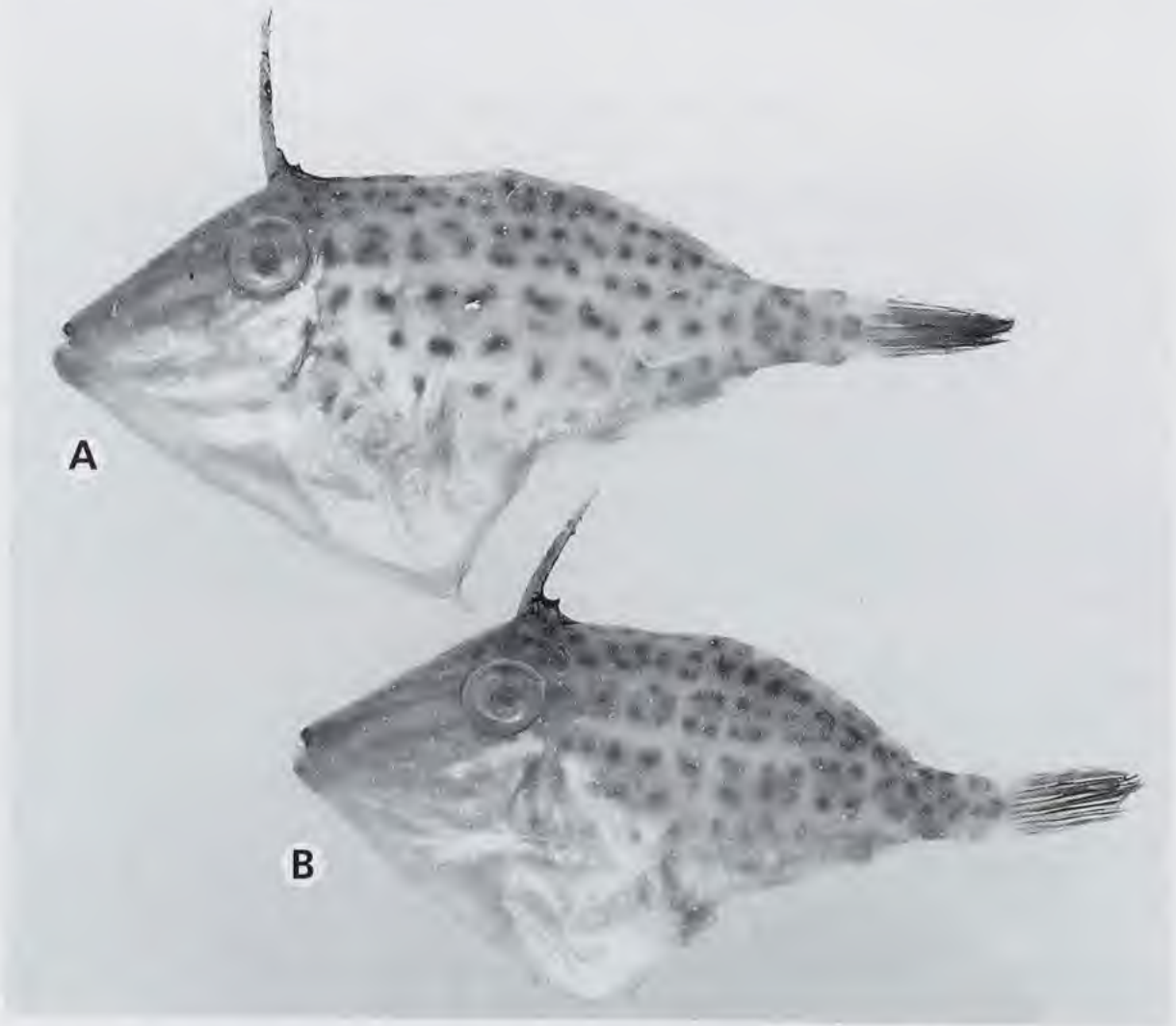

FIG. 16. — *Thamnaconus tessellatus* (Günther, 1880), CHALCAL 2, stn CP 26, 2 of 4 specimens. **A**, **B**: 61.0 mm and 54.0 mm SL (MNHN 1995-550).

Source : MNHN, Paris

FIG. 17. — *Thamnaconus tessellatus* (Günther, 1880), MUSORSTOM 5, stn CP 318, 1 specimen: 189 mm SL (MNHN 1995-551).

Family **ARACANIDAE**

Aracanids are primitive boxfishes, most of whose species are found in relatively deep waters in temperate and tropical seas in the Indo-west Pacific, although a few species (e.g., *Aracana aurita* and *A. ornata*) occur in shallow waters. The greatest number of species of aracanids is found in the waters of Australia; however, none of the species of *Kentrocapros* have been found there.

Genus ***KENTROCAPROS*** Kaup, 1855

Kentrocapros flavofasciatus (Kamohara, 1938)

Fig. 18

Aracana flavofasciata Kamohara, 1938: 44, fig. 23 (Japan).

MATERIAL EXAMINED. — 6 specimens.

New Caledonia. CHALCAL 2: stn CP 27, 23°15.29'S, 168°04.55'E, 289 m depth, beam trawl, R. V. *"Coriolis"*, 31 October 1986: 1 specimen, 89.2 mm SL (MNHN 1995-542). — Stn DW 78, 23°41.30'S, 167°59.60'E, 233 - 360 m depth, Waren dredge, 30 October 1986: 1 specimen, 63.6 mm SL (MNHN 1995-540). — Stn DW 82, 23°13.68'S, 168°04.27'E, 304 m depth, Waren dredge, 31 October 1986: 1 specimen, 89.0 mm SL (NSMT-P.46811).

MUSORSTOM 4: stn CP 172, 19°01.20'S, 163°16.00'E, 275-330 m depth, beam trawl, R. V. *"Vauban"*, 17 September 1985: 1 specimen, 108 mm SL (MNHN 1995-541) (photograph of this specimen in Fig. 18).

BERYX 11: stn CP 16, 24°47.12'S, 168°08.71'E, 240-250 m depth, beam trawl, R. V. *"Alis"*, 16 October 1992: 1 specimen, 44.8 mm SL (NMNZ-P.29089). — Stn CP 24, 24°43.40'S, 168°07.65'E, 260-280 m depth, beam trawl, 17 October 1992: 1 specimen, 38.2 mm SL (NMNZ-P.29082).

DESCRIPTION. — Meristics. Dorsal 11 (10); anal 10; pectoral 12.

Kentrocapros flavofasciatus was previously known from only eight specimens (MATSUURA & YAMAKAWA, 1982; MATSUURA, 1988). Although this species is similar to *K. rosapinto* (Smith, 1949), known from the southwestern Indian Ocean and South Africa, it differs from the latter by the position of the gill opening; in

Source : MNHN, Paris

K. flavofasciatus the gill opening is slightly oblique, located below the posterior half of the eye, with the posterior end of the gill opening not reaching below the posterior edge of the eye; in *K. rosapinto* the gill opening is almost vertical or very slightly oblique, located below the posterior edge of the eye, with the posterior end of the gill opening reaching below or beyond the posterior edge of the eye.

The New Caledonian materials include two juveniles, 38.2-44.8 mm SL, which are much smaller than any other specimens previously collected. Because there are allometric changes in many characters, we record the proportional measurements below separately for the juveniles and adults.

Proportional measurements of the juveniles. Head length 38.8-41.9% SL, snout length 25.7-28.8% SL, eye diameter 19.0-22.3% SL, interorbital width 22.3-23.3% SL, postorbital length 8.3-10.2% SL, gill opening length 7.8-7.9% SL, snout to dorsal fin 77.7-80.6% SL, snout to anal fin 75.9-78.3% SL, body depth 54.0-59.9% SL, body width 35.3-37.2% SL, dorsal-fin height 19.9-22.0% SL, anal-fin height 20.1-21.2% SL, length of dorsal-fin base 10.7-11.6% SL, length of anal-fin base 10.5% SL, pectoral-fin length 25.7-28.0% SL, caudal-fin length 24.6-27.7% SL, caudal peduncle depth 8.9% SL, caudal peduncle length 15.7-20.1% SL, tail length (measured from posterior edge of lateral ridge of carapace to mid-caudal-fin base) 17.3-19.0% SL, tail depth (vertical distance between posterior edges of structural bases of last dorsal and anal-fin rays) 22.5-23.0% SL.

Proportional measurements of the adults. Head length 32.8-36.9% SL, snout length 24.5-26.1% SL, eye diameter 15.6-19.7% SL, interorbital width 13.8-15.9% SL, postorbital length 8.8-9.8% SL, gill opening length 9.9-13.9% SL, snout to dorsal fin 72.7-77.0% SL, snout to anal fin 71.7-77.0% SL, body depth 45.1-50.3% SL, body width 26.4-31.8% SL, dorsal fin height 19.5-20.4% SL, anal-fin height 17.4-19.3% SL, length of dorsal-fin base 10.9-11.1% SL, length of anal fin base 9.5-10.5% SL, pectoral fin length 22.4-25.6% SL, caudal-fin length 20.3-25.5% SL, caudal peduncle depth 8.1-8.6% SL, caudal peduncle length 19.5-21.1% SL, tail length 20.8-21.9% SL, tail depth 21.1-23.2% SL.

FIG. 18. — *Kentrocapros flavofasciatus* (Kamohara, 1938), MUSORSTOM 4, stn CP 172, 1 specimen: 108 mm SL (MNHN 1995-541).

The two juveniles from New Caledonia differ from the adults in several morphometrics, such as head length, eye diameter, interorbital width, and body depth. However, these differences are considered to be allometric and similar to such changes as found in other tetraodontiform fishes. The juveniles also differ in color from the adults.

Source : MNHN, Paris

They have no longitudinal dark bands on the sides of the body, whereas the dorsal half of their sides and back are covered with many dark spots. In this respect the juveniles are more similar to females than to males.

DISTRIBUTION. — *Kentrocapros flavofasciatus* has been recorded from the Pacific coast of southern Japan and the East and South China seas in depths of 80-120 m (MATSUURA & YAMAKAWA, 1982). The six specimens from New Caledonia represent the first record of this species from the south Pacific, and suggest that the distribution of this species is antitropical.

Family **OSTRACIIDAE**

Ostraciid boxfishes are distributed in shallow waters in tropical seas worldwide. Although there are many osteological differences between ostraciids and aracanids, the most striking differences in external characters are the following: in ostraciids there are no isolated bony plates on the caudal peduncle (except mid-dorsally and mid-ventrally in some species of *Acanthostracion*), and there are eight (vs. nine) branched rays in the caudal fin.

Genus ***TETRASOMUS*** Swainson, 1839

Tetrosomus gibbosus (Linnaeus, 1758)

Fig. 19

Ostracion gibbosus Linnaeus, 1758: 332 (India).

MATERIAL EXAMINED. — 3 specimens.

New Caledonia MUSORSTOM 4: stn CC 146, 19°53.40'S, 163°47.10'E, 34 m depth, otter trawl, R. V. *"Vauban"*, 13 September 1985: 3 specimens, 125-166 mm SL (MNHN 1995-533) (photograph of 130 mm SL specimen in Fig. 19).

FIG. 19. — *Tetrosomus gibbosus* (Linnaeus, 1758), MUSORSTOM 4, stn CC 146, 1 of 3 specimens: 130 mm SL (MNHN 1995-533).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal 9; anal 9; pectoral 10.

Tetrosomus gibbosus is similar to *T. reipublicae* (Ogilby) in having the body triangular in cross section. However, it differs from the latter by having a deeper body and only one dorsal carapace spine (vs. two spines) on the dorsal ridge.

DISTRIBUTION. — *Tetrosomus gibbosus* is a common ostraciid boxfish in the tropical regions in the Indo-west Pacific (MATSUURA, 1988).

Family **TRIODONTIDAE**

The only extant species of this family is one of the deeper water species of tetraodontiforms and is still relatively rare in museum collections. This family is the most primitive extant sister group of all other extant tetraodontoid families (the tetraodontid-diodontid clade and the molids), with only the Eocene eoplectids being more morphologically primitive than triodontids.

Genus ***TRIODON*** Cuvier, 1829

Triodon macropterus Lesson, 1829

Fig. 20

Triodon macropterus Lesson, 1829: pl. 4; 1830: 103 (to accompagny 1829 illustration) (Mauritius).

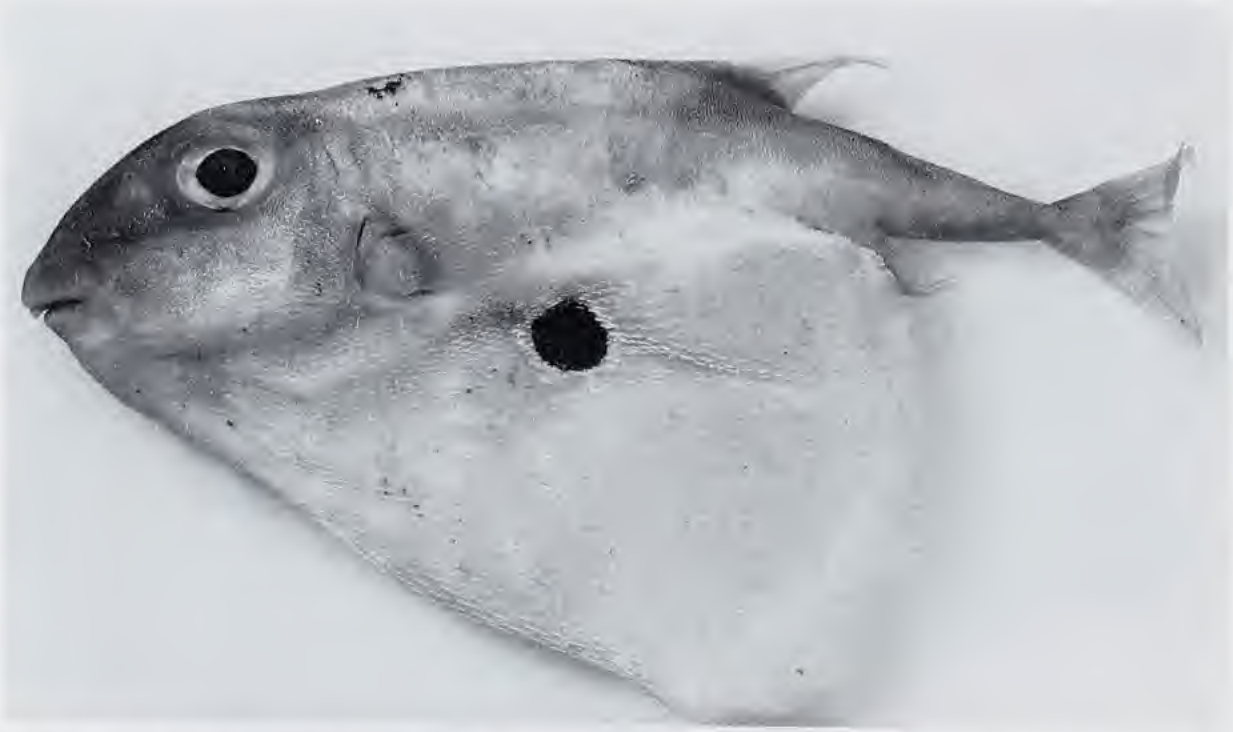

FIG. 20. — *Triodon macropterus* Lesson, 1829, MUSORSTOM 5, CP 279, 1 of 2 specimens: 235 mm SL (MNHN 1994-592).

Source : MNHN, Paris

MATERIAL EXAMINED. — 2 specimens.

New Caledonia. MUSORSTOM 5: stn CP 279, 24°08.72'S, 159°37.76'E, 160- 270 m depth, beam trawl, R. V. *"Coriolis"*, 10 October 1986: 2 specimens, 235-377 mm SL (MNHN 1994-592 & 593) (photograph of 235 mm SL specimen in Fig. 20).

DESCRIPTION. — Meristics. Dorsal II (rudimentary), 11; anal 10; pectoral 15-16.

The presence of a rudimentary spiny dorsal fin is typical of specimens of the western Pacific populations of this species, while in specimens from the Indian Ocean the rudimentary dorsal-fin spines are usually absent (TYLER, 1967, 1980).

The sac-like nature of the extension of the coelomic cavity into the dewlap of skin that can be flared between the body and the long shaft-like pelvis is especially evident in both specimens because of its distention with fluid.

Until recently this species has only been known on the basis of large adults, mostly 300 to 550 mm SL, with only a few specimens as small as 224 mm SL, to which the ORSTOM specimen of 235 mm SL is similar in morphometrics. Five much smaller specimens of 89-103 mm SL were collected in 1986 off Queensland, Australia (TYLER & PATTERSON, 1991).

DISTRIBUTION. — This species has been recorded in 50-300 m from Japan through Indonesia, Australia, and the Philippines to east Africa (TYLER & PATTERSON, 1991, and contained references) but not previously as far east in the south-west Pacific as New Caledonia.

Family **TETRAODONTIDAE**

Puffers are peculiar in having an inflatable stomach and, in many species of the Indo-west Pacific, strong poison in their viscera, blood, and even in the muscles. Most species of tetraodontids are shallow water inhabitants, occurring in various habitats such as coral reefs, rocky reefs, sandy-muddy flats, and estuaries; however, several members of the family, such as *Arothron firmamentum*, *Sphoeroides pachygaster*, and a few species of large-sized *Takifugu*, are taken from continental shelves and slopes deeper than 100 m.

Genus ***AROTHRON*** Müller, 1841

Arothron firmamentum (Temminck & Schlegel, 1850)

Fig. 21

Tetraodon firmamentum Temminck & Schlegel, 1850: 280, pl. 126, fig. 2 (Japan).

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. BERYX 11: stn C41, 23°39.20'S, 168°00.50'E, 230-360 m depth, otter trawl, R. V. *"Alis"*, 20 October 1992: 1 specimen, 242 mm SL (NMNZ-P.29244).

DESCRIPTION. — Meristics. Dorsal 16; anal 14; pectoral 16.

Arothron firmamentum differs from all other species of *Arothron* by the higher dorsal and anal-fin ray counts and the pointed dorsal and anal fins.

DISTRIBUTION. — Although all other species of *Arothron* inhabit coastal waters, usually around coral reefs, *Arothron firmamentum* is a relatively deep-water inhabitant, frequently taken by trawl in depths of 30-80 m (HARDY, 1980). The New Caledonian specimen was taken at a much deeper depth than previously recorded (180 m, see HARDY, 1980). *Arothron firmamentum* is antitropical in distribution and has been recorded from Japan, Australia and New Zealand (HARDY, 1980). Three specimens of this species have recently been collected

Source : MNHN, Paris

from South Africa; the counts, measurements and color patterns of these specimens all agree well with specimens from Japan (P. C. HEEMSTRA, pers. comm.)

FIG. 21. — *Arothron firmamentum* (Temminck & Schlegel, 1850), BERYX 11, stn C 41, 1 specimen: 242 mm SL (NMNZ-P.29244).

Genus ***CANTHIGASTER*** Swainson, 1939

Canthigaster callisterna (Ogilby, 1889)

Fig. 22

Tetrodon callisternus Ogilby, 1889: 74, pl. 3, fig. 5 (Lord Howe Island).

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. BERYX 11: stn CP 44, 23°41.30'S, 168°00.57'E, 230-250 m depth, beam trawl, R. V. *"Alis"*, 20 October 1992: 1 specimen, 45.5 mm SL (NMNZ-P.29043) .

DESCRIPTION. — Meristics. Dorsal 11; anal 10; pectoral 17.

Canthigaster callisterna is similar to *C. rivulata* (Temminck & Schlegel) and *C. flavoreticulata* Matsuura in having longitudinal bands on the sides of the body. *Canthigaster callisterna* differs from *C. rivulata* in having 11 (vs. 10) dorsal-fin rays, and from *C. flavoreticulata* in 11 (vs. 10) dorsal-fin rays and 17-18 (vs. 16) pectoral-fin rays.

DISTRIBUTION. — *Canthigaster callisterna* has been recorded from New South Wales, Australia, Lord Howe and Norfolk islands, northern New Zealand, and the Kermadec Islands (ALLEN & RANDALL, 1977). Judging from the previous records, the occurrence of this species in New Caledonia is not surprising. The New Caledonian specimen was collected much deeper than any previously reported specimens.

Source : MNHN, Paris

FIG. 22. — *Canthigaster callisterna* (Ogilby, 1889), BERYX 11, stn CP 44, 1 specimen: 45.5 mm SL (NMNZ-P.29043).

Canthigaster rivulata (Temminck & Schlegel, 1850)

Fig. 23

Tetraodon rivulata Temminck & Schlegel, 1850: 285, pl. 124, fig. 3 (Nagasaki Bay, Japan).

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. MUSORSTOM 4: stn DW 204, 22°37.00'S, 167°05.70'E, 120 m depth, Waren dredge, R. V. *"Vauban"*, 27 September 1985: 1 specimen, 36.8 mm SL (MNHN 1995-532).

FIG. 23. — *Canthigaster rivulata* (Temminck & Schlegel, 1850), MUSORSTOM 4, stn DW 204, 1 specimen: 36.8 mm SL (MNHN 1995-532).

Source : MNHN, Paris

DESCRIPTION. — Meristics. Dorsal 10; anal 10; pectoral 16.

DISTRIBUTION. — *Canthigaster rivulata* is one of the common sharpnose puffers and a large-sized species, attaining 147 mm SL (ALLEN & RANDALL, 1977). It has been recorded from the Hawaiian Islands, Japan, Taiwan, South China Sea, Western Australia, Seychelles Islands, and Somali (ALLEN & RANDALL, 1977). *Canthigaster rivulata* is a relatively deep-dwelling species, taken from depths as great as 230 m (MATSUURA, 1985). Although many species of *Canthigaster* are shallow water inhabitants, usually found around coral reefs, four species, *C. flavoreticulata*, *C. investigatoris*, *C. inframacula*, and *C. rivulata*, are known to occur in depths in excess of 100 m (ALLEN & RANDALL, 1977; MATSUURA, 1986).

Genus ***SPOEROIDES*** Anonymous (Lacepède, 1798)

Sphoeroides pachygaster (Müller & Troschel, 1848)

Fig. 24

Tetrodon pachygaster Müller & Troschel, 1848: 677 (Barbados).

MATERIAL EXAMINED. — 3 specimens.

Chesterfield and Bellona Plateaus. CHALCAL 1: stn CH 2, 22°34.41'S, 159°17.39'E, 330 m depth, otter trawl, R. V. *"Coriolis"*, 28 July 1984: 1 specimen, 238 mm SL (MNHN 1995-534) (photograph of this specimen in Fig. 24).

New Caledonia. BERYX 11: stn CP 25, 24°43.52'S, 168°08.52'E, 230-235 m depth, beam trawl, R. V. *"Alis"*, 17 October 1992: 1 specimen, 249 mm SL (NMNZ-P.29240). — Stn C41, 23°39.20'S, 168°00.50'E, 230-360 m depth, otter trawl, 20 October 1992: 1 specimen, 213 mm SL (NMNZ-P.29243).

FIG. 24. —*Sphoeroides pachygaster* (Müller &Troschel, 1848), CHALCAL 1, stn CH 2, 1 specimen: 238 mm SL (MNHN 1995-534).

DESCRIPTION. — Meristics. Dorsal 9; anal 9; pectoral 15 (16).

Source : MNHN, Paris

DISTRIBUTION. — Although SHIPP (1974) recorded *Sphoeroides pachygaster* in the Pacific only from the Philippines and Hawaii, it is frequently taken by trawl in deep waters around Japan (MATSUURA, 1988) and has been recorded from New Zealand and Australia (HARDY, 1981). This species differs from other species of *Sphoeroides* by having no spinules or spines on the body. It is distributed in temperate and tropical waters worldwide. The deepest record of this species is 480 m (SHIPP, 1974).

Genus ***TORQUIGENER*** Whithley, 1930

Torquigener brevipinnis (Regan, 1902)

Figs 25-26

Tetrodon brevipinnis Regan, 1902: 300 (Indonesia).

MATERIAL EXAMINED. — 7 specimens.

New Caledonia. MUSORSTOM 4: stn CC 146, 19°53.40'S, 163°47.10'E, 34 m depth, otter trawl, R. V. *"Vauban"*, 13 September 1985: 3 specimens, 75.9-81.3 mm SL (NSMT-P.46812). — Stn CC 147, 19°35.00'S, 163°39.60'E, 46 m depth, otter 13 October 1985: 4 specimens, 67.3-84.4 mm SL (MNHN 1995-526) (photographs of 67.3 and 75.9 mm SL specimens in Figs. 25-26).

DESCRIPTION. — Meristics. Dorsal 9 (8); anal 8; pectoral 15 (14-16). Because HARDY (1984) redescribed this species in detail on the basis of 12 specimens, no detailed description is needed here.

DISTRIBUTION. — This species has primarily been recorded from Indonesia and Papua New Guinea (HARDY, 1984), but it occurs also in southern Japan (MATSUURA, 1988). HARDY (1984) showed that this species has been captured in moderately deep waters (34-100 m).

FIG. 25. — *Torquigener brevipinnis* (Regan, 1902), MUSORSTOM 4, stn CC 147, lateral view, 2 of 4 specimens. **A**, **B**: 75.9 mm and 67.3 mm SL (MNHN 1995-526).

Source : MNHN, Paris

Genus ***TYLERIUS*** Hardy, 1984

Tylerius spinosissimus (Regan, 1908)
Fig. 27

Spheroides spinosissima Regan, 1908: 253, pl. 31, fig. 5 (Saya de Malha Bank).

MATERIAL EXAMINED. — 5 specimens.

New Caledonia. MUSORSTOM 4: stn CC 173, 19°02.50'S, 163°18.80'E, 250-290 m depth, otter trawl, R. V. *"Vauban"*, 17 September 1985: 1 specimen, 69.5 mm SL (MNHN 1995-536). — Stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m depth, otter trawl, 3 October 1985: 2 specimens, 108-110 mm SL (NSMT-P.46813) (photograph of 110 mm SL specimen in Fig. 27). — Stn CC 246, 22°08.50'S, 167°11.50'E, 410-420 m depth, otter trawl, 3 October 1985: 1 specimen, 76.3 mm SL (MNHN 1995-535). — Stn CC 248, 22°09.50'S, 167°10.00'E, 380-385 m depth, otter trawl, 4 October 1985: 1 specimen, 70.9 mm SL (MNHN 1995-537).

FIG. 26. — *Torquigener brevipinnis*, MUSORSTOM 4, stn CC 147, dorsal view of the specimens shown in Fig. 25 (MNHN 1995-526).

DESCRIPTION. — Meristics. Dorsal 8 (7); anal 7; pectoral 16 (15-17).

This species was described in great detail by HARDY (1981) and the present specimens from New Caledonia do not require comment.

DISTRIBUTION. — This species is widely distributed in the Indo-west Pacific from South Africa to northwestern Australia and northward to the South China Sea (HARDY, 1984).

Source : MNHN, Paris

FIG. 27. — *Tylerius spinosissimus* (Regan, 1908), MUSORSTOM 4, stn CC 245, 1 of 2 specimens: 110 mm SL (NSMT-P.46813).

ACKNOWLEDGMENTS

We thank Guido DINGERKUS for initially showing us the valuable ORSTOM collections of deep-water tetraodontiforms collected by French research vessels off New Caledonia and assembled in Paris; we are grateful to Bernard SÉRET for loaning these to us for study. We similarly thank Clive ROBERTS for making available to us the comparable collections made by New Zealand research vessels and assembled in Wellington. We are grateful to B. RICHER DE FORGES, Clive ROBERTS, and the other expedition leaders and members of the respective French and New Zealand crews whose diligence at sea resulted in such comprehensive collections of well-preserved and often rare or new benthic organisms from off New Caledonia. Our thanks also go to Barry J. HUTCHINS and Phillip C. HEEMSTRA for providing us with their unpublished information on monacanthids and *Arothron firmamentum*, respectively. This study was partially supported by grants of Monbu-sho (Ministry of Education, Science and Culture of Japan: nos. 04640696 & 06640913) to K. MATSUURA.

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Source : MNHN, Paris

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18 JUIL. 1997

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À ABBEVILLE

Date de distribution : 11 juillet 1997
Dépôt légal : juillet 1997
N° d'impression : 10084

Source : MNHN, Paris

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ÉDITIONS
DU MUSÉUM
57, RUE CUVIER
75005 PARIS

ISBN 2-85653-500-3
ISSN 1243-4442

245,04 FF TTC (France)
240 FF HT (Étranger)

Source : MNHN, Paris